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THE

Croonian Lectures

ON SOME

DISORDERS OF MOTILITY AND OF MUSCLE TONE,

WITH SPECIAL REFERENCE TO THE CORPUS STRIATUM.

Delivered before the Royal College of Physicians of London

BY S. A. KINNIER WILSON, M.D., B.Sc. EDIN., F.R.C.P. LOND.,

PHYSICIAN FOR OUT-PATIENTS, NATIONAL HOSPITAL, QUEEN-SQUARE; JUNIOR NEUROLOGIST, KING'S COLLEGE HOSPITAL; CONSULTING NEUROLOGIST, METROPOLITAN ASYLUMS BOARD.

LECTURE II.*

MR. PRESIDENT AND GENTLEMEN,—Hitherto our investigation of the characteristics of "voluntary" movement in affections of the corpus striatum has been prosecuted on general lines. It is time to turn to a more precise examination of individual "voluntary" acts for differing parts of the body musculature, as an essential preliminary to an analysis of various kinds of so-called "involuntary" movement occurring in these diseases. There is the more need for this investigation in that we are now approaching a clinical field where confusion reigns supreme in respect of nomenclature. Among the tangled mass of movements described by different observers as "primitive automatisms," "higher coördinations," "associated movements," "position alterations," "reaction reflexes," "reflex synergias," "movement synergias," "associated reactions," "automatised voluntary movements," "reaction movements," and what not, the student may well be excused if he loses his way. (The above terms have been culled *verbatim* from the pages of various writers on the subject and might be added to considerably.) The need for classification is urgent, but it can be met only by first analysing normal movement and by coming to a decision on definitions.

BEHAVIOUR OF MUSCULAR COMPONENTS OF "VOLUNTARY" MOVEMENT IN STRIATAL DISEASE.

I have already indicated the lines I shall follow in this connexion. I shall take a normal movement to have as constituents the actions of prime movers or protagonists, synergists (including fixation muscles), and antagonists respectively. I shall not call the whole a "synergic unit," or a "movement synergia," but simply a movement, with the component parts just enumerated.

The following are the single or combined movements that have been studied in normal persons and in a large number of cases coming into the category of striatal disease :—

I. Head, face, and neck.

1. Shut eyes, with or without resistance; eyeballs roll up.
2. Turn eyes to side; head turns also.
3. Open mouth, against resistance; head extends.
4. Turn eyes up; forehead wrinkles, head extends.
5. In supine position, flex head on chest; recti abdominis contract.
6. Flex head against resistance; platysmas, omohyoids, hyoid depressors contract.
7. With head in one extreme lateral position (say, right) rotate it slowly to left; left posterior rotators contract first, and right sternomastoid only after head is well past the mid-line. And vice versa.

II. Shoulder, arm, hand, and fingers.

1. Abduct extended arm at shoulder; opposite erector spinæ contracts.
2. Adduct extended arm from horizontal position; homolateral rectus abdominis and erector spinæ contract (only if against resistance).
3. In erect position, advance extended arm to horizontal level in front—both erectores spinæ contract; rotate it horizontally backwards—homolateral erector spinæ at once relaxes; bring it forward again on horizontal level—the same erector spinæ contracts again; depress extended arm once more to side—homolateral erector spinæ once more relaxes.
4. With arm flexed at elbow and forearm pronated, supinate (biceps does this); triceps contracts to prevent further flexion at elbow.
5. Flex fingers in grasping; extensors of wrist contract. Increase grasping movements; triceps contracts.
6. Open closed hand; extensors of wrist relax: flexors of wrist contract.
7. Extend wrist with fingers closed—extensores carpi radiales and ulnaris contract; without stopping wrist extension, open fingers—the wrist extensors at once relax, while the extensors of the fingers continue the upward movement.
8. Press thumb firmly against forefinger; flexor carpi ulnaris contracts.
9. Abduct little finger; extensor ossis metacarpi pollicis contracts.
10. Extend thumb; extensor and flexor carpi ulnaris contract.
11. Abduct forefinger; thumb nearly always flexes or adducts and, if so, extensors of thumb contract.

III. Trunk and legs.

1. Supine position; lift one extended leg (i.e., flex at hip); contralateral hamstrings (internal or external group, or both) contract.
2. Supine position; lift head and shoulders up; recti abdominis contract, then both recti femoris.
3. Erect position; abduct one extended leg at hip; opposite tensor fasciæ femoris contracts.
4. Flex spine—i.e., bend forwards (not against resistance); both erectores spinæ contract.
5. Bend backwards—i.e., extend spine: recti abdominis contract. Combining (4) and (5), recti and erectores alternately contract and relax.
6. Incline spine to right or left; opposite erector spinæ contracts.

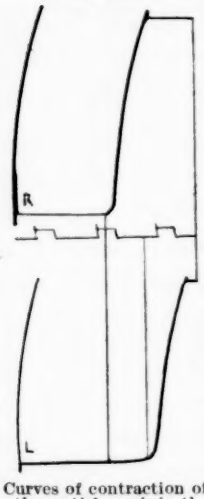
This scheme contains a description of the precise behaviour of muscular components in a number of normal movements and movement-combinations, and has been carried out *in extenso* in many examples both of paralysis agitans and of postencephalitic Parkinsonism.

With minor qualifications to be referred to immediately, *my definite conclusion is, that these movements are executed normally by Parkinsonians—that is to say, the movements follow normal physiological lines and are neither lost nor perverted.* I have not seen a single instance either of failure to perform the movement (except as below), or of interference with normal physiological order. In what might be termed "movements of sequence" (viz., I. 7, II. 7, III. 5 above), I have not found any departure from the normal. By this term I mean movements which are begun by one muscle or muscular group and continued by another. My former chief, the late Dr. C. E. Beevor, devoted attention to these, showing the order of action to be so fixed physiologically that it cannot be voluntarily modified, and that if one muscle in the total act fails its place cannot readily be taken by another which might appear suitable for the purpose. He said, "it rather reminds one of some highly organised establishments where if one of the servants is incapacitated it is no one's place to do the work, which is consequently left undone." The qualifications I would make are, that if the action of the agonists is inherently weak that of the other components is correspondingly feeble and therefore difficult to recognise, though as a general rule the introduction of an element of resistance against which to work intensifies the "voluntary" effort and so may bring out the constituents better. For example, I find that the triceps often will not partake in the hand-grasping movement (II. 5 above) because the latter cannot be executed with sufficient power. Further, some of the finger movements specified above, notably abduction of the little finger, may in fact almost fail, for reasons already sufficiently

* Lecture I. appeared in THE LANCET last week.

gone into. Again, in some normal persons part of the movement is facultative rather than obligatory—e.g., in I. 4 the forehead may not wrinkle; we must avoid, therefore, an overestimation of such "loss" in Parkinsonian cases. The study of these movements, finally, in seriously advanced cases of the disease is open to the objection that myogenic contractions may have set in, and this will naturally vitiate the clinical findings.

FIG. 12.



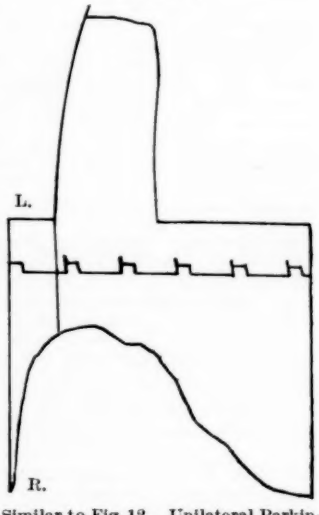
Curves of contraction of the recti femoris in the combined movement of sitting up from a supine position. Unilateral Parkinsonian case. The affected muscle (left) contracts about three-quarters of a second later than that on the normal side.

The main conclusion stands, and has weight. I find myself, therefore, unable to confirm in a general sense the observations of Foerster, who states that in pallidal cases (as he calls them) the eyes do not roll up when they are closed against resistance, the head does not move when the eyes are deviated laterally, and so on. As a consequence, *the theory according to which the "loss" of these "Mitbewegungen"* (an unfortunate terminology), *in reality the components in a total single movement, is held to prove that the corpus striatum is a "centre" for their normal activation, is shown to be based on erroneous observation and to have no foundation in fact.*

I may take this chance of again entering a caveat against the view that because muscular action is hindered or encounters obstacles it is *pro tanto* "lost." In some instances of excessive muscular rigidity, especially among postencephalitic cases, the movement of the head accompanying lateral deviation of the eyes is minimal, yet to describe it as "lost" and at the same time to ignore the multiplicity of factors in Parkinsonian immobility would be a mistake. Of the comparative slowness with which the above enumerated movements are sometimes performed there can, of course, be no question, nor of the frequent weakness of some of them. In respect of the slowness, the records from unilateral cases of postencephalitic Parkinsonism are instructive. In the movement of raising the shoulders from the supine position (III. 2 above) the normal individual contracts both recti femoris simultaneously and within a very brief period after the shortening of the recti abdominis. In unilateral cases delay in the contraction of the rectus femoris on the affected side has been constantly found, but I have failed to note any difference in this respect in that of the twin recti abdominis. For example, Fig. 12 gives a tracing from a case of this kind, showing on the Parkinsonian side a delay of about three-quarters of a second in the contraction of the muscle on the front of the left thigh compared with that on the right (unaffected) side. Fig. 13 gives another record of the same kind, where the difference in time of contraction is almost one second. The fact that I have found no certain distinction in rate of contraction between the two recti abdominis (once or twice a very slight retardation on the affected side has seemed present) is doubtless to be explained by the physiological unity of the two (though to this there are exceptions), according to Broadbent's hypothesis. But the difference in the case of the two recti femoris is striking. Their rôle in the movement is that of accessory prime movers; arising from the ilium, they are flexors of the hip and their shortening serves to bring the pelvis into a more vertical position. No delay in contraction took place as regards the first prime movers (recti abdominis) in the cases from which the tracings were obtained, no doubt owing to their bilateral innervation. The two recti femoris contract with equal *power*, as the curves indicate; and when the patient is given the order to lie down again it is seemingly the healthy muscle that decontracts the more slowly, the Parkinsonian muscle relaxing faster (Fig. 13). No trace of tonic innervation or of slow relaxation with a "lengthening reaction" is here observable.

In some instances from my records, on the other hand, weakness is discernible while slowness of contraction or relaxation cannot be detected. We have seen (II. 6 above) that when the closed fist is opened the extensors of the wrist immediately relax while the extensors of the fingers contract. Fig. 14 shows the constituent actions as they occur in the normal individual, relaxation of the former and contraction of the latter being practically simultaneous. Figs. 15 and 16 are from cases of Parkinson's disease; in Fig. 15, on the signal given, the wrist extensors are seen to relax at the same moment as the finger extensors contract, without any retardation, and notwithstanding the obvious tremor with which the movement is accompanied. In Fig. 16 the lower tracing shows clearly the gradual weakening of the contraction of the wrist extensors before the signal—in other words, the *inability to maintain an innervation* which often characterises Parkinsonism. On the signal, however, the normal procedure at once occurs, though the decontraction of the wrist extensors is fractionally slower than the contraction of the finger extensors and exhibits the so-called "cogwheel" phenomenon (to be afterwards discussed).

FIG. 13.

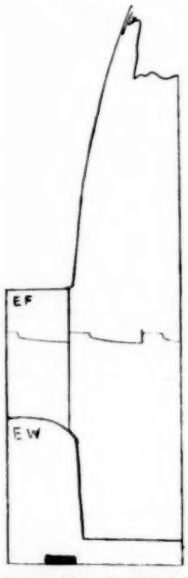


Similar to Fig. 12. Unilateral Parkinsonian case. The rectus femoris of the normal side (right) contracts before the other and also takes longer to decontract as the patient lies back again.

Equally instructive are the tracings of the combined movement described under II. 3 above. The extended arm (say, left) is advanced to the shoulder level in front, swept back in a circle-arc on this horizontal level, brought forward again, then down to the side. As this is being done the left erector spinæ contracts, relaxes, contracts again, relaxes again. Fig. 17, from a normal individual, is to be compared with Fig. 18, from a severe case of chronic postencephalitic Parkinson syndrome. It must be borne in mind, to understand the meaning of the tracings, that in the erect position the erectores spinæ of the normal person are not in action; in the Parkinsonian, with his typical forward inclination of the trunk, they are, on the contrary, in strong ("involuntary") contraction. Now when the two records are examined the reader will see that, notwithstanding the steady "postural" contraction of the spinal muscle in the Parkinsonian, its successive "voluntary" contraction and relaxation follow normal physiological lines; it rises and falls exactly as does the normal erector spinæ, at the appropriate signals. Particularly instructive are the two points (1) that at the beginning of the "voluntary" movement the already posturally contracted erector spinæ *contracts still further;* (2) that when it is beginning to relax normally as the movement is coming to a close it springs again into this steady "involuntary" contrac-

tion. (Although the Parkinsonian record is slower than the other the two are not in this respect comparable, since no attempt was made to have the patient perform the movement quickly.) The actions of the erector spinæ during the execution of the combined movement are not characterised either by undue retardation or by limitation of range; that is to say, that component of a "voluntary" movement of the synergic action of which the patient is quite unaware (no one in thus advancing and rotating the arm has any idea that the erector spinæ constantly partakes therein), and which, as indicated at the outset, is "involuntary" in the sense that it is inevitable and largely outside consciousness, can and does impress itself on the existing background of postural "involuntary" contraction, modifying the latter in the course of its own appropriate action. A single instance of this description shows incidentally the unsatisfactory character of the usual distinctions drawn between "voluntary" and "involuntary," for we have here the idea of *degrees of involuntariness*, one major and the other minor, one part of a so-called "voluntary" act, the other part of a so-called postural contraction. Further, these illustrations serve to lend point to the statement made in the introduction, that in objective characters, clinically speaking, "voluntary" movements are not to be distinguished from those in which the element of "volition" is lacking. Neither the examiner's finger nor the myographic tracing reveals any difference between the contraction of the erector spinæ at (*c*) (Fig. 18), and at (*d*) (same Fig.), but the former, according to the usual conceptions, is "voluntary" and the latter "involuntary." As a clinician, I cannot say where "volitional" activity ends and "non-volitional" activity begins.

FIG. 14.



Normal hand, with fist closed "voluntarily." On the signal ("open the hand") the extensors of the fingers contract and the extensors of the wrist relax simultaneously.

The conclusion is, that notwithstanding weakness, slowness, rigidity, and tremor, the ordinary muscular components of "voluntary" movement behave physiologically in cases of striatal disease, contrary to the views of not a few writers on the subject.

We may now pass to the consideration of another class of movement, which I shall call

MOVEMENTS OF COÖPERATION.

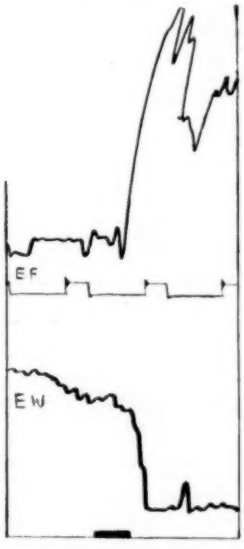
By this expression I wish to signify movements that are auxiliary to other, also "voluntary" movements, preceding or accompanying these as the case may be. Thus when a person seated on a chair is requested to stand up he first of all brings his feet in underneath his body, to a sufficient extent, in any case, to place them under, or almost under, his centre of gravity. An essential preliminary to the main movement, the rising up, it aids the latter by enabling it to be performed with appropriate ease and may therefore be described as a movement of coöperation. Other writers have called it an "associated movement," an "automatic movement," a "reaction movement," and have declared specifically that such are defective or lost in disease of the corpus striatum. The expressions, "automat c movements" or "automatisms," however, must be avoided, for all degrees exist, from "most automatic" to "least automatic" (i.e., "voluntary"), and no one can say when a movement passes out of the "voluntary" into the "automatic" group. If I have to go down an unknown staircase in the dark, I will gauge the height of the first few steps by feeling with my feet; having estimated it I will probably thereafter proceed more quickly, but I do not pass from a "voluntary" to an "automatic" movement thereby, as if these are two different *sorts* of movement; my stepping movement, a "voluntary" movement, is "variably automatic." Nor is it appropriate to call the movement of drawing the feet under the body a "reaction movement," as Foerster does; in one sense all movements are reaction movements, and the expression becomes meaningless. I shall reserve the term for another group (to be referred to immediately) where definite stimuli are used to provoke response. Finally, as we shall see, the expression "associated movement" is equally devoid of specificity unless it is properly restricted in its connotation.

This movement of coöperation, then, I have found to be as a fact present in all cases of Parkinsonism provided the feet are, prior to the assumption of the erect position, placed a little way out from the chair. Applying the test to normal individuals, I have noticed that they can rise up without this auxiliary and preliminary leg flexion as long as the knee angle does not exceed, say, 135°; even then, only with an obvious effort do they "throw themselves" up. Exactly the same principle applies to the Parkinsonian; since he rarely sits with limbs extended, and his customary attitude is one of flexion, his feet are already in a position *de choix* as a rule, and he can rise without the auxiliary flexion, but put them out a little and invariably he brings them in to begin with, slowly and unequally as may be. *To say that this and analogous movements are "lost" and to argue therefrom that the corpus striatum is a centre for "automatic" or "associated" movements is, therefore, a fundamental mistake.* Similar remarks apply to the slight outward movement of the feet (extension of the legs) which takes place almost invariably after the normal person has resumed his seat, provided his limbs are close to the chair, or touching it, as he sits down. (This movement, however, is scarcely one of coöperation,

FIG. 15.

Case of severe Parkinson's disease. On the signal ("open the hand") the extensors of the fingers contract and those of the wrist relax simultaneously, in spite of rigidity and tremor.

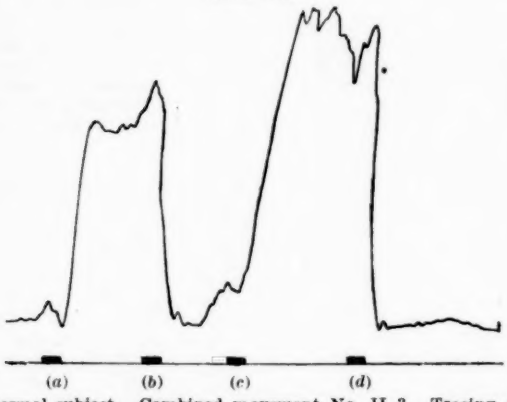
FIG. 16.



Similar case to Fig. 15. Same correct physiological interrelation of extensors of fingers and of wrist. Note how the "voluntary" contraction (synergic) of the extensors of the wrist weakens before the signal (inability to maintain a "voluntary" contraction).

but rather of relaxation, since sitting with limbs flexed at the knees to less than a right angle may become uncomfortable.) The common flexion attitude of the Parkinsonian explains the usual absence of the little outward extension, but in not a few cases (and these not instances of only moderate rigidity) it is readily observable. In one case of bilateral Parkinsonian

FIG. 17.



Normal subject. Combined movement No. II. 3. Tracing of contractions of homolateral erector spinæ. (*a*) Extended arm advanced to horizontal level in front: e.s. contracts; (*b*) arm swept back on same level: e.s. relaxes; (*c*) arm brought forward again: e.s. contracts; (*d*) arm brought down to side: e.s. relaxes.

symptoms (left side more affected than right) the movement constantly occurred on the left side, but never on the other.

Another movement of coöperation to which attention has been given is that accompanying the movement of turning round on a chair. When a person, seated on a chair, is asked to turn—i.e., move his body—round to right or left (hands clasped in the lap), he first of all abducts the leg of the side to which he is to move, then as this auxiliary movement is closing he turns his body, and when the latter movement, similarly, is coming to its end he moves up the other leg in adduction to its fellow. As a rule the head turns simultaneously with the trunk. In the case of Parkinsonian patients the same sequence is commonly observable; occasionally the contralateral leg is slightly adducted before abduction of the homolateral limb, while the head may turn before the trunk, curiously enough. No outfall of subsidiary movement is found to occur, however, in spite of these occasional variations, which, for that matter, sometimes characterise the same act in the normal person.

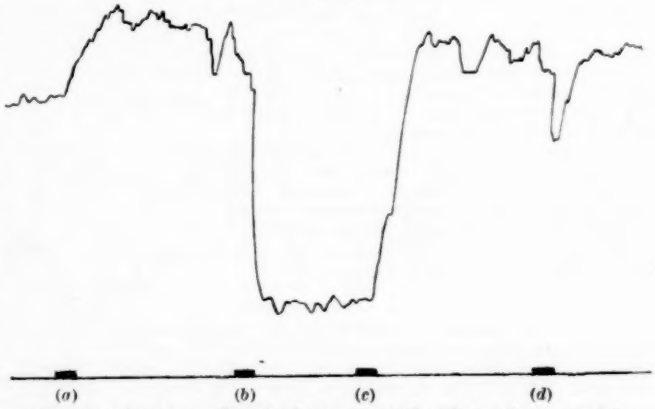
More interesting is the swinging action of the arms in walking, and in a way more important, in view of the fact that it is constantly referred to as an "associated movement," and its supposed "loss" in striatal disease as constantly taken to argue the existence of a physiological centre for "associated movements" in the normal corpus striatum.

"ASSOCIATED" MOVEMENTS.

Few terms are as much in vogue and at the same time as vague in meaning as this is, and its inherent indefiniteness will remain, unless, indeed, each writer will specify the exact sense in which he employs it. In ordinary neurological parlance the term, I take it, is used to denote the involuntary movements of one limb, say one arm or segment of the arm, which may be seen to accompany forceful voluntary movements of its fellow on the other side. Such movements have long been known to be readily elicitable, more particularly in cases of hemiplegia and diplegia—in the former condition usually from the *sound* to the *affected* side, in the latter indifferently from either. The "associated" movement on the second side may, or may not, be a "mirror" movement of that on the first side (to employ the expressions devised by Hughlings Jackson in his descriptions of the variety of epilepsy that bears his name); it often "spreads" on the second side in a way not to be seen on the first. Foerster speaks of them as "the normal [sic] synergias of pyramidal cases"—an unfortunate expression, in view of the fact that they are found in diseased states. It is confusing to find included by Foerster under the same term those muscular actions (extension of the wrist during closure of the fingers, &c.) which we have seen are precisely the normal muscular components of a total single normal movement. Moreover, this author places in the same category of "normal synergias" the spread of movement in hemiplegic cases from one group to another in the *same* limb, as when such a patient cannot flex his forearm without pronating and abducting at the same time, and also the "mass movements" of tetraplegia and spastic paraplegia. No distinction, apparently, is drawn by him between the "associated movements," in his sense, of normal individuals and of hemiplegics, normal and abnormal being classed together; and, finding them both awanting, as he considers, in pallidal cases, he reaches the conclusion already indicated, that the normal corpus striatum is the centre for this type (these types) of movement.

There is here, I consider, a plain error of deduction. Most observers are agreed on the general absence in striatal cases of the above-mentioned and well-known "associated movements" of pyramidal cases, wide-spreading, tonic, reflex movements which are the result of release of function of lower and older motor mechanisms, and which are pathological in the sense that for their appearance a pathological condition of the corticospinal system is usual. But it is illegitimate to maintain that the absence in *striatal* disease of

FIG. 18.



Parkinsonian case. Combined movement No. II. 3. Compare with Fig. 17. (For details, see text.)

the pathological "associated movements" that are proper to the diseased *pyramidal* system argues for their localisation in the basal ganglia. Taking Foerster's own statement, that they are also to be found in the form of "mass movements," we know the latter may be seen in cases of total transverse lesion of the cord—a condition with which the corpus striatum has nothing to do in any direct sense, since it is anatomically severed and as much out of action as in destroying striatal lesions. *The conclusion is unmistakable, that this type of "associated movement" is not effected through the globus pallidus and has no connexion therewith.*

As for the ordinary "movement synergias" of normal persons—i.e., the normal muscular components of a single movement—the "normal involuntary associated movements of agonistic synergists," in Foerster's elaborate phrase—we have already found them to be typically present in Parkinsonian and other striatal cases, and it is therefore impossible to subscribe to his theory, that they are effected by sensory impulses streaming to the globus pallidus via the optic thalamus from the beginning to the end of "voluntary" movement and *ipso facto* disappear in disease of that part of the basal ganglia. This theory is based on erroneous observation.

Arm-swinging in Walking.

Leaving pathological (pyramidal) "associated movements" and normal components of "voluntary" movement (which ought never to be classed in the group under discussion) on one side, we next ask ourselves whether any other variety remains. And here we may revert to the question of the swinging movements of the arms in walking. My own investigations lead me to suggest they should be regarded rather as "movements of coöperation" in the sense defined above. They are auxiliary movements, practised to enable the individual to maintain balance better during the act. Though normal, they are in no respect inevitable, for the simple reason that anyone can walk with his hands clasped behind his back, or with his arms held stiffly in front or in any other artificial fashion. He will at once, however, be conscious of the lack of ease in walking thus, and will revert with relief to the normal swinging. At the other extreme is the powerful use made of the swinging arms by expert athletes in walking races, when the upper limbs can be seen to be voluntarily utilised by exaggerated sweeping movements across the chest with a view to facilitating progress. I cannot assent, therefore, to the opinion either that this arm movement is a constant normal "associated movement," or that it is purely "automatic."

Of its common reduction or cessation in Parkinsonian cases let me admit at once there can be no question. If the normal individual is carefully watched, the movement, I find, largely consists of moderate flexion at the elbow, with but slight advance of the limb at the shoulder. On the whole, the arm moves through a wider range in front of the mid-axillary line than behind it. Now if a Parkinsonian be watched as he walks with body stripped, absence of any forward movement at the shoulder will at once claim the observer's attention, and as a slight advance at the proximal end of the limb would, of course, result in a materially wider excursion at the distal end, its failure to occur will affect the whole limb. In a fair number of instances, however, some flexion at the elbow takes place. In other, asymmetrical, examples of the disease the less affected arm will move with some freedom as compared with the worse; in unilateral cases the sound arm will move normally enough, but this class of case sometimes presents unusual and interesting features. A moment's thought will remind us that the normal arm is moving with the impeded leg, and I find on observation of several such examples that the movement of the sound upper limb is made to correspond with and in a sense to compensate for the defect of the opposite lower limb. Thus in one case (largely right-sided) the left arm was always advanced to a distinctly *greater* extent than usual, and this corresponded strictly to a slower advancement of the weak right leg. In another case (also right-sided), the normal left arm was never quite at the side, but was held in advance continuously and made a swinging movement through a rather reduced range in this advanced position. In unilateral instances the movement of the sound arm is "variably automatic."

It is instructive to note how frequently intelligent patients are aware of this imperfection of arm-swinging during their walk, even at a comparatively early stage, but if they are asked deliberately to swing the arms—"as they should do"—curious effects may result. For example, while some will manage for a time to move the arms alternately and appropriately, the movement will have a somewhat unnatural look; others, again, as I have seen more than once, move the arms forward and backward together in a ridiculous way; another patient (unilateral left-sided case), told to swing the left arm "properly" as she walked, did so only at the expense of the right arm, saying, "if I try to swing my left arm my right arm stops swinging." Patients, too, who when given a similar request hold both arms forward with a minimum of swing have been observed. In one case the patient made the spontaneous remark that the left arm (affected side) "felt different"; "in walking I feel as if the left arm has no weight, as if it were hanging by a thread." Another made the candid and illuminating observation: "It is easier not to swing my arms."

The explanation of this frequent though not universal phenomenon is to be found by reference to more than one consideration. Undoubtedly the factor of proximal rigidity plays a significant rôle, as is immediately evident when the patient walks stripped; involuntary contraction of deltoid and upper arm muscles keeps them relatively tense, and no alternating "play" between anterior and posterior groups is observable. I have not yet seen a case of reduction of this specific arm movement in which these muscles could be said to exhibit normal muscle tone. The hemiplegic patient does not swing his rigid arm. The matter of muscular "effort," again, cannot be ignored, and the same remarks are applicable in this respect as have been offered above, apropos of the Parkinsonian's general immobility. Largely "automatic" though the arm-swinging be, it encounters resistance; hence not to do it is "easier." In forcing the movement deliberately the Parkinsonian encounters the same difficulty as with any of his "voluntary" movements, and the result is one or other of the various anomalies already enumerated. Nor must it be forgotten, as before-mentioned, that arm movements are not absolutely essential in the walking act, and since the patient can as a fact walk without their aid, the faint element of conscious volition which should assist in stimulating them to action is ignored.

My conclusion, therefore, is to the effect that, this arm-swinging being neither constant, essential, nor purely "automatic," and partaking more of the nature of movements of coöperation or auxiliary movements than of involuntary or reflex associated movements, its reduction or absence in cases of striatal disease cannot be regarded as in any way supporting a theory of the localisation of "associated movements" or of "automatisms" in the corpus striatum.

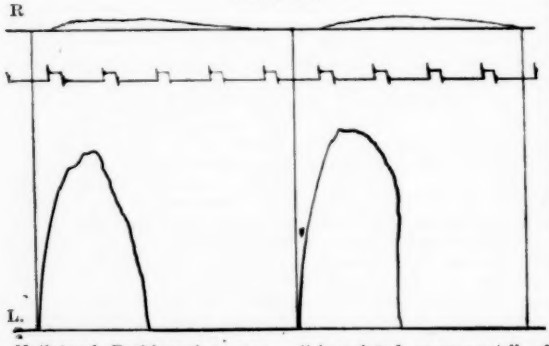
PRESENCE OF CERTAIN "ASSOCIATED MOVEMENTS" IN STRIATAL DISEASE.

Finally, under this heading, I wish to direct attention to the frequent or almost constant occurrence, mainly in unilateral cases of Parkinsonism and allied conditions, of a variety of "associated movement" from the *affected* to the *sound* side, but not, as a rule, vice versa. Many times have I had occasion to observe how in the performance of individual "voluntary" movements with the affected arm, hand, or fingers (especially in the case of the latter two) an identical, "mirror" movement is executed on the sound side, smaller in range as a rule and usually at least as slow as the other—sometimes, in fact, more prolonged. For instance, abduction of the little finger on the weak side is accompanied by the same movement of the normal finger, extension of the wrist on the affected side by extension of the wrist on the other, and so on. In ordinary bilateral cases these phenomena are very often awanting, but should one side be more affected than the other they are commonly still to be seen, always from the more weak to the less weak side. So much is this the case that the observer can thus sometimes decide, by a rapid and simple test, which of the two sides is the more involved.

The tracing reproduced in Fig. 19, taken from a unilateral case, shows how flexion of the forefinger of the affected arm (below), relatively good if somewhat tremulous, is accompanied by a fine flexion of the forefinger of the normal hand, beginning a fraction of a second later, considerably more restricted in range, and, in this instance, continuing a second or two after the movement of the first side has ceased. (Kinematograph films that I have had taken give more striking examples of the crossed muscular action.)

Movements of this character have been described in another connexion by Pierre Marie and Foix as "syncinésies d'imitation," and are stated to occur indifferently from either side in cases of hemichorea and hemiathetosis. The peculiarity here remarked is their occurrence mainly *from* the *affected*, or more affected, *to* the *sound*, or less affected, side in cases of striatal disease, which, according to the usual views, are characterised by absence of all "associated movements." Comment has already been made on the loose way in which this expression is employed, so much so that it is in danger of becoming valueless; but while the phenomena just described differ in some respects from the familiar involuntary "associated movements" of pyramidal affections they clearly exhibit in point of fact the element of "association"

FIG. 19.



Unilateral Parkinsonian case. "Associated movement" of right (normal) index finger during "voluntary" flexion of left forefinger (affected side). The associated contraction is much less in degree but lasts longer.

and deserve attention. They can be, and often are, inhibited, especially if the subject becomes aware that the examiner's attention is directed to the crossed movement rather than to the requested movement of the weak limb; but they are not found to occur in normal people, where individualisation of movement is perfectly developed, and I do not believe, as do Marie and Foix, in the existence of a "normal tendency" to imitation by one side of the movements of the other. Simple though the movement is, a satisfactory explanation is not easily found. The conjecture might be hazarded that the peculiar unilaterality, the occurrence mainly on the unaffected, or less affected, side, points to an "overflow" of the innervation current at a low (cord) level to the corresponding motor centre of the other side, conceivably because of the relative "block" encountered by it in the (affected) muscle units to which it is directed; this tendency to cross-innervation is readily inhibitable from the cortex. Since no such obstacle is met on the healthy side, there is no tendency when *it* is innervated for the current to cross to the affected side. I do not think that any explanation based on bilateral representation of individual movements in the cortical motor centres applies here; we cannot say it is in any way customary for such corresponding muscular groups to be innervated simultaneously and identically, at least in the case of the muscles of the fingers and hands, where marked individualisation is the rule.

In further contradiction of the general opinion as to loss of "associated movements" in striatal affections, a word may be said on a peculiar variety of synkinesis which I first noticed a number of years ago in cases of paralysis agitans and which has been repeatedly observed in patients suffering from the diseases of this group, while it is according to my investigations of but rare occurrence in normal persons. When the Parkinsonian is asked to make a series of successive right and left conjugate deviating movements of the eyeballs (the head being kept steady) he very frequently blinks his eyelids as the eyes pass from one extreme lateral position to the other. The blinking movement, of which he appears to be unaware, is sometimes quick, sometimes slow and deliberate. In more than one case a quick double eyelid flicker has been distinctly and repeatedly observed. This transient complete or incomplete eyelid closure is the more noteworthy in that Parkinsonians as a rule are conspicuous for the poverty of blinking movements, as has been made the subject of previous allusion. Now normal subjects, who blink easily and readily, do not show this particular "associated movement" to anything like the same extent, though I do not say it is never seen. So high a proportion of Parkinsonian patients exhibit it that I have come to regard it as more typical of that condition than of any other. Yet no explanation of this eye-blinking associated movement that I can think of can be said to be satisfactory, and for the present I am content to note its existence.† (A kinematographic film of this "associated movement" was exhibited.)

Summing up our clinical data and our deductions therefrom, we are justified in the *general conclusion, that striatal disease is not characterised by complete outfall of "associated movements"; we naturally do not expect the special variety discoverable in pyramidal affections to be present in extrapyramidal disease and therefore cannot in any sense describe it as "lost"; other varieties are actually found in striatal maladies and not in normal subjects; others still have been erroneously included in this class of movement and any argument based on their reduction or absence is thereby vitiated.*

MOVEMENTS OF REACTION AND DEFENCE.

In this category are comprehended movements in response to definite stimuli and those performed by way of protection or defence from some nocuous excitation. Such motor responses are frequently designated "reflex movements," but this term is undesirable. In the intact organism an immediate response to a nocuous stimulation is called "reflex," as when the eyes are closed on the flash of a bright light (in any flashlight group photograph a percentage of the "sitters" are seen to have their eyes shut). Yet in numerous instances a conscious element cannot be said to be excluded. The hand is moved with urgency from the contact of a hot surface, but the sensory impulse must reach the cortex first, there to awaken a conscious sensation of heat. Otherwise expressed, the "reflex" arcs extend to the cortical level, and if so it is preferable they should be distinguished as a class from reflexes confined to lower physiological levels, however analogous their mechanism.

The general statement is frequently made by those concerned to defend current conceptions of striatal function that in striatal disease all movements of reaction and of defence ("automatisms") are impaired or lost, whence we may infer the tacit assumption is drawn either that consciousness enters into striatal activity or that striatal "automatisms" blend in some undefined way with higher (cortical) coördinated movements. My own observations in this respect also lend no countenance to the theory of striatal function erected thereon.

† I have under my care in hospital at present a remarkable case of postencephalitic Parkinsonism in a young woman. She exhibits extremely slow, incomplete, and punctuate lateral deviation of eyes to right and left, but she has discovered for herself that if she lets her eyelids droop, or shuts the eyes, as she deviates the eyeballs conjugately from side to side, their movement becomes at once quicker and more complete.

When testing for the class of movements now under review it is imperative the subject should have no cognisance of what is about to be tried out. I devised a series of chair-tilting tests in which the patient's chair was abruptly moved in one direction or another by an assistant behind him, while the observer was seated in front. The degree to which conscious knowledge of the tests to be made interferes with the reactions is sufficiently indicated by the remark of a patient whose responses became less and less as the examination proceeded and who, when comment was made thereon, said, "I know now you won't really let me fall off." Cases of severe generalised Parkinsonism were selected for the purpose, the patient being seated on a chair with hands on lap and then tilted abruptly forwards or backwards or to one or other side. A single series may be briefly summarised to illustrate results. In this instance the case was that of a woman of 28, suffering from the post-encephalitic variety.

(1) Tilted to L. The left leg was at once abducted, the left arm extended, abducted away from the trunk, and directed towards the corner of a table which stood near. As further falling to the left continued, the right arm was in turn brought across and directed also to the table. There was no movement of the right leg.

(2) Tilted to R. The right arm was immediately extended and abducted and the fingers extended as if to save from the floor. The left leg was notably abducted, extended, and elevated, as if to counterbalance the right lateral deviation. No movement was observed in left arm or right leg.

(3) Tilted backwards. Both arms were at once thrown out in extension in front, both legs were abducted, and slightly extended at the knees.

Pushing tests were utilised in the same case, the subject having the eyes closed to obviate fore-knowledge.

(1) Sudden push backwards. Both arms were thrown out in front in full extension.

(2) Sudden push to L. and R. respectively. In each instance there was marked quick abduction of the ipsilateral leg, with slight abduction of the contralateral arm.

All sorts of variations have been seen in different subjects, and in some the reactions have been considerably restricted as compared with the above. Thus in the case of a man of 27 (postencephalitic form) in whom the left side was distinctly more affected that the right, chair-tilting to the *left* evoked abduction of the *right* leg, then feeble abduction of the left, while the edge of the chair was gripped with the right hand; whereas, on tilting to the *right* only the *right* leg was abducted, and no movement of the left limbs was detected. On sudden pulsion backwards the same individual's reaction was confined to slight but definite advancing of the right arm. Another patient whose responses to these tests seemed peculiarly meagre (a girl of quick intelligence, she early realised that she would not be allowed to hurt herself), was asked to bend backwards as far as she could, on the pretence of examination of the back muscles. The supporting hands were suddenly removed, when at once both her arms were thrown forward and she tried to catch hold of the assistant standing in front.

In view of these findings, which might be readily amplified, we shall be careful in our interpretation of the seeming absence of reaction among Parkinsonians to peripheral stimuli of differing sorts. Foerster, for example, says they exhibit no movements of reaction to irritation from flies, but neither do the moribund, nor the profoundly asthenic from serious illness, nor those in whose case for other physical reasons the reaction requires an effort. "It is easier not to." Indifference and apathy led to similar absence of reaction on the part of the long-suffering soldier on the Gallipoli Peninsula. In short, *so manifold are the factors leading to this apparent poverty of reaction movements, and so clearly is there resident in them a cortical, because conscious, element, that their ascription to striatal function can be dismissed* as a conjecture lacking inherent probability no less than any clinical support.

The question can be further probed by resort to the familiar tests for defence-reactions to stimuli along the sense avenues of touch, sight, hearing, &c. With the proviso that the subject be unaware of what is to be examined for, the nostril, ear, or throat can be tickled, visual or auditory excitations of a sufficiently "threatening" or "alarming" character utilised, or painful cutaneous stimuli employed, and in practically all instances a response or reaction will be evoked, proving the inaccuracy of the general statement already referred to. If the hand be suddenly passed across in front of the patient's eyes with a threatening gesture he blinks and may withdraw the head; at the unexpected bursting of an air-filled paper bag he also blinks; when the auditory meatus, or the nostril, is tickled with a paper "spill" the head is inclined away, and so forth. Only in exceptional instances do such reactions fail. Thus I have seen tears running from the eyes of a Parkinsonian when his anterior nares were tickled, yet no outward reaction was otherwise noticeable; another patient blinked his eyes when a feather entered his external auditory meatus but the head did not move away. I have convinced myself, further, of the general inaccuracy of the view according to which patients with paralysis agitans furnish no visible evidence of a reaction to painful cutaneous stimuli; on the contrary, withdrawal from the nocuous excitation in my experience rarely fails. If the fauces are irritated with a paper "spill" moderate "gagging," with movement of eyes and mouth, results more or less regularly.

In seeking an explanation for the occasional absence, and less infrequent reduction, of movements of reaction and defence we do not require, as hinted above, to go past the factors already enumerated, in particular, that of awareness, the action of which has been sufficiently demonstrated. I shall not be misunderstood, I hope, when I say also that with certain patients of the hospital class the rôle played during examination by a "superior" is so passive as of itself to tend to reduce external reactions to a minimum. Many patients by no means as generally immobile as the Parkinsonian will submit to repeated pin-pricking in sensory tests with stoical calm, and the same is true of ordinary sole-stimulation in investigating the plantar reflex. As a persistent background in rigid cases is the muscular state, which of itself, as we have several times had occasion to remark, contributes to reduction of facile reactions, to an extent, indeed, that cannot be ignored.

MOVEMENTS OF EXPRESSION.

Hitherto our concern has been exclusively with the so-called "voluntary" motor system and its activities when there is reason to believe the striatal system is largely out of action, but I must now refer to another class of movement which, commonly called "involuntary," is nevertheless more conveniently discussed at this stage than later, when we come to examine chorea, tremor, and athetosis.

Scarcely any greater clinical contrast can be imagined than between the mobile and facile emotional expressions of the Sydenham's choreic and the "starched" and "fixed" facies of the Parkinsonian. In the latter it is not an absence of all expression but rather a fixity of expression, a lack of ease in passing from one expression to another, a lingering exteriorisation of emotion, with which we have to deal.

Though not specifically alluded to in the classical monograph of James Parkinson, the Parkinsonian "mask" is a classic symptom, not requiring elaboration by any writer of to-day. I may state briefly that patients can and do both laugh and cry, that their expressions frequently exhibit an exaggeration amounting almost to a *rire* or *pleurer spasmodique*, and that in unilateral cases the affected side moves more slowly than the other in the expanding or unfolding of its expression, but tends to maintain this after the other has become normal again. A distinction is to be drawn, none the less, between the

true *rire et pleurer spasmodiques* of the pseudobulbar and the exaggerated facial emotional expression of the Parkinsonian, in that the "convulsive" element of the former is awanting in the latter instance, in which also there is far less implication of the respiratory part of the mechanism for the display of emotion, while the quality of the laugh is often inferior. As a postencephalitic patient remarked, "I used to have a ringing laugh, but now I make a silly noise." It is not that, as in pseudobulbars, double hemiplegics, cases of disseminated sclerosis, and so on, the facio-respiratory emotional apparatus is "released" into exaggerated action, but that the apparatus itself, an "involuntary" mechanism, is subject to the same muscular disabilities, so to speak, as have been described in the case of the "voluntary" motor system. For we are dealing, as is immediately understandable, with skeletal, not with unstriped, muscles; the problem pertains to the "involuntary" use of a "voluntary" musculature. Now there is no good reason to suppose the "inward" or central (psychical) part of the mechanism has undergone a change; the Parkinsonian is no less conscious than the normal person of the stimulus that conduces to laughter or awakens tears; hence such abnormalities as he shows must be set down, inter alia, to the existing hypertonic condition of the muscles involved, that rigidity which seriously interferes with facility in or versatility of muscular play. In a study of the subject published a year or two ago attention was specifically drawn to impairment of the expression of the emotions from organic lesions, and allusion was made to alterations consequent on paresed, rigid, ataxic, and other states of the facio-respiratory apparatus; among these, Parkinsonian rigidity is to be included. The important point that I wish to make at present is that *the mimic or expressional movements under consideration are "most automatic" or "least voluntary," but they nevertheless reveal disorder of function as definitely as do so-called "voluntary" movements.* (I am in no sense dealing here with the varying respiratory disturbances that have been observed within the last few years among the sequelæ of epidemic encephalitis.) It is the more necessary to stress this point in view of the distinction which some have attempted to prove exists between "voluntary" and "involuntary" use of the musculature in paralysis agitans, the former exhibiting defects of function and the latter not. The evidence now adduced lends no support to this attempted differentiation. (See also below.)

Poverty or lack of movements of the limbs in gesture and expression is, of course, a mere corollary of what we have learned as to the "Bewegungsarmut" in general. The "mimische Starre" or mimic fixity of the Parkinsonian, inclusive both of facies and of limbs, is a consequence of more than one factor, of factors already sufficiently discussed, and is, in my opinion, erroneously described as a mimic "paralysis," for reasons given above. Hence, when Binswanger and others argue as it were backwards from the symptomatological to the physiological, and place in the corpus striatum a "higher coördination centre for unconscious mimic and gesture play," they misinterpret the clinical phenomena in the first instance and overlook other significant clinico-anatomical data in the second. For, in the article already alluded to on "Pathological Laughing and Crying," I have brought forward evidence to suggest that there are corticifugal (non-pyramidal) paths from the frontal lobes via the optic thalamus to the facio-respiratory centres in the pons and medulla, and that these are the routes taken by emotional impulses to modify the facio-respiratory synkinesis in the direction either of laughter or the reverse; genuine absence of emotional movement, genuine emotional palsy, occurs from lesions situated *ex hypothesi* anywhere on these tracts, from the cortex to at least as low as the pons. *No theory attributing emotional disorders to disease of the corpus striatum alone can be accepted, since it fails to include a number of germane clinical and pathological facts.*

MUSCLE TONE.

By muscle tone is commonly understood that condition of contraction of a resting muscle which exists without "voluntary" innervation and which holds the limb in a given position. It also exists when the limb is passively supported, for the muscles do not "sag" or hang flaccid. When, further, the limb is passively moved a mild resistance to the displacement is encountered; when it is held and shaken the segments concerned exhibit no flail-like swinging as do those of a limb considered to be hypotonic or atonic. Thus muscle tone gives a shape to muscles, and is in evidence both in resting (static) and moving (kinetic) states of the musculature. According to the researches of Sir Charles Sherrington, tone is in reality postural contraction, that is to say, it is a moderate contraction of muscle-fibres effected reflexly by sensory excitations arising in peripheral end-organs, substantially those of the muscles themselves. In virtue of this reflex contraction, a muscle will adapt itself to the maintenance of any posture, whether the fibres are in fact in a shorter or longer anatomical state; the property of adjustment of length of fibre, and of exercise of contracting power whatever the length, he described as "plasticity," whence has arisen the use of the term "plastic tone," to be referred to immediately. All clinicians agree that lesions interrupting the proprioceptive reflex arc underlying muscle tone confirm the conception by producing, as a fact, loss of tone.

The point next arises whether this muscular function of reflex contraction is subserved by all or by a special group of striated muscle-fibres. I can now only refer in the very briefest fashion to a hypothesis that has gradually developed more particularly during the last decade, to the effect that all fibres partake in postural tone but that (as the form of the hypothesis due especially to Hunter has it) there is a subdivision of labour, so to say; some fibres, said to be histologically recognisable, are innervated by the motor or efferent limb of the proprioceptive arc alluded to above—i.e., by the somatic nervous system—and contract reflexly during change of posture; they are considered to be responsible for what has been called "contractile tone," because they contract in response to appropriate stimuli. Other fibres, stated to be histologically distinguishable, are innervated by the sympathetic nervous system, but they are not contractile; their length is supposed to be *passively* altered during the activity of neighbouring contractile fibres (the first group); and their postulated function is to remain at a given fixed length once movement of the others has ceased, and thus to aid or support the maintenance of posture otherwise determined. They are said to be responsible for "plastic tone"—i.e., the element in postural tone concerned with the adaptation of a muscle to the new posture assumed after movement. "Plastic tone" and "contractile tone" together make up "postural tone."

While Hunter asserts the sympathetically innervated fibres for "plastic tone" are *non-contractile*, he makes no reference, as far as I have seen, to the old Vulpian's phenomenon (1862), recently reinvestigated by Langworthy. The latter finds that stimulation of the lingual nerve (containing bulbar autonomic fibres) leads to slow wavy contractions of the tongue muscles after complete degeneration of the hypoglossal nerve-endings by previous section, and is inclined, therefore, to believe in the possibility of *contraction* via the sympathetic nervous system.

Be this as it may, the identity of tone and of contraction cannot be seriously questioned. For physiological proof of this statement the clinician has to turn to recent work with the string galvanometer (personally I have had no opportunity of prosecuting such researches and must rely in this respect on the investigations of others). Very briefly, it has been shown by exact methods that an action-current exists in normal muscle at rest, that there is no notable difference in the action-current as between active ("voluntary") movement and passive move-

ment, that the action-current of normal muscle differs from that of rigid and spastic muscles only quantitatively, not qualitatively. Further, the curves of the current during passive movement of a hypertonic muscle are the same as those of strong "voluntary" innervation; no qualitative distinction is to be found between the action-currents (during both active and passive movement) of Parkinsonians and of hemiplegics; or between the action-currents of the same conditions when the muscles are at rest. In respect of this latter point, the curves both in hemiplegia and in paralysis agitans are more marked than in resting normal muscle, and in paralysis agitans rather more than in the pyramidal affection (Hansen, Hoffmann, von Weizsäcker, Wachholder, Mann and Schleier, and others). The general conclusions are, that tone and "active" innervation are analogous phenomena, that only quantitative differences are to be detected between the action-currents of "voluntary" innervation and of hypertonic states of pyramidal and extrapyramidal origin, that the muscle tone exhibited on passive movement in these morbid conditions (resistance to stretching) is entirely analogous to the so-called tetanic innervation of "voluntary" contraction. A number of years ago Lewandowsky maintained that "tonus is nothing else than the observation of a particular attitude for which the same laws hold good as for the carrying out of a movement."

What actually happens when "volition" innervates a resting tonic muscle is probably that it strengthens the existing ("involuntary" or reflexly produced) contraction, as is suggested by a significant experiment of Graham Brown, to which attention was drawn in my paper on "The Old Motor System and the New." According to Holmes, tone "fuses with muscular contractions otherwise aroused [e.g., by 'volition'], reinforcing them, making them more tonic." The reader is referred again to the tracing obtained from the erector spinæ of a Parkinsonian during the combined arm movement described above (Fig. 18). From this record it is clearly established that the existing "involuntary" or postural contraction of that muscle (its tone—in this instance, hypertonia) is *reinforced* by the "volitional" element of active contraction, so that the curve rises still further, if somewhat slowly. I attach importance to this demonstration, since Hunter asserts (without, seemingly, offering evidence in support) that "in voluntary movement postural tone, made up of a contractile and a plastic component, is first *inhibited*" (italics mine); according to my observations this is incorrect.

The difficulties of gauging tone by ordinary clinical methods are considerable; we estimate the "feel" of the muscles by reference to our own subjective standard based on knowledge derived from palpation of many presumably normal muscles; we observe attitude; we impress a passive movement on the muscle concerned; we calculate its "stretchability." From what has been already shown at various previous stages in our discussion, the difficulty is increased by inability to separate "voluntary" from "involuntary" contraction by objective clinical methods; by the fact that the conscious patient will often "unintentionally" coöperate during passive movement, so-called; by the varying degree of "automatism" in any frequent movement; by recognition of the truth that not all attitudes are "involuntary." In view of the physiological data obtained by the string-galvanometer method, moreover, we are really asking ourselves to estimate merely *quantitative* differences, a task of obvious arduousness. While major degrees of hypo- or hyper-tonia do not, as a rule, offer any difficulty, minor degrees escape us clinically, and the passing from a reflexly determined contraction to an incipient "voluntary" contraction (without displacement) is for practical purposes not determinable. Conversely, we lack methods for gauging with exactitude at what point a postural tone reaction fixes or stabilises a movement begun by "volition."

A further introductory word is necessary in respect of the recent tendency to differentiate somewhat rigorously and schematically movement from posture, and kinetic from static muscular contractions. Speaking generally, "volition" is taken to imply *movement*, and reflex action, *posture*, yet the inapplicability of the generalisation must be plain to the reader; posture is often maintained "voluntarily," and much reflex action is of a definite kinetic character. Movement is in reality a series of changes of posture, and Sherrington has stated that the distinction between reflexes of posture and reflexes of movement is not clear-cut. That two entirely separable mechanisms should be responsible for posture and movement respectively is *primâ facie* improbable, in view of this statement of Sherrington's for reflex action, and of the known phenomena of "voluntary" action. Cogent arguments against this differentiation have recently been urged by Bard, with whose contentions I find myself in substantial agreement.

MUSCLE TONE IN STRIATAL DISEASE.

Study of an average case of Parkinsonism or of progressive lenticular degeneration, even by the comparatively crude clinical methods to which we have resort, at once reveals the presence of increase of muscle tone. The muscles stand out and have shape: where their tendons are visible these are salient; to the palpating finger they are firm and tense; they offer definite resistance to passive extension, and more force is required to effect passive displacement. Further, such patients exhibit "at rest" an attitude, indicative of access of tone in certain groups.

Distribution of Muscle Hypertonia.

The bellying of the skeletal musculature is more or less universal, but is more recognisable, on the whole, in those groups whose contraction underlies the maintenance of specific Parkinsonian attitudes (sternomastoids, erectores spinæ, deltoid, biceps brachii, supinator longus, wrist extensors, long finger flexors, interossei, thenar and hypothenar groups, knee flexors, tibialis anticus, &c.). Rigidity—i.e., resistance to passive movement—is so widespread that it may be described as general, though it is more pronounced at the larger joints, being presumably there a question simply of muscle mass. Even when a limb or limb segment is passively put in such a position as to relax muscles as far as possible hypertonia is evident. In the recumbent posture the sternomastoids do not relax. When any joint of any limb is passively displaced resistance is encountered whatever the direction of the displacement. We have already had evidence pointing to the implication even of quite small muscles—e.g., those of the larynx—in this generalised rigidity, and it is doubtful whether the external ocular muscles completely escape. In the result, the patient can often be passively moved *en bloc*; if the head be rocked about the trunk follows its every move, and so on. A degree of rigidity equal to that of the severest pyramidal cases is probably attained but seldom (unless, indeed, the stage of myogenic contracture has been reached); it is not so easy to pull a Parkinsonian about by one leg, the other following, as it is in the case of a pronounced spastic paraplegia.

Characters of the Muscular Hypertonia.

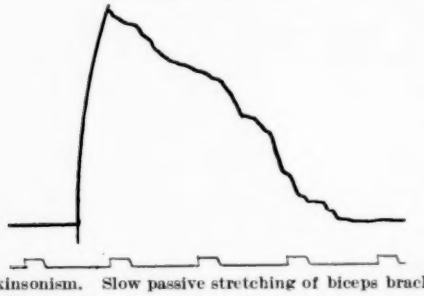
When the hypertonic muscle of the striatal case is passively stretched resistance is felt from beginning to end of the movement; in the milder cases the origin and insertion points of the muscle to be tested should first be approximated and the passive stretching should be comparatively fast. If the stretching is quite slow little or no resistance may be demonstrable. The explanation doubtless is to be sought in the stimulation of proprioceptive end-organs by the abruptness of the initial passive movement, with consequent reflex increase of the muscular contraction and therefore of resistance. Strümpell is of the

opinion that striatal rigidity remains more or less the same whether the passive movement be slow or abrupt, gentle or powerful, but my observations do not confirm this view, nor do I consider it can be applied as a clinical method of distinguishing pyramidal from extrapyramidal rigidity. Figs. 20 and 21 are two records from the same muscle (biceps brachii) of an advanced postencephalitic Parkinsonian; in the former of these the muscle (already contracted) was passively and slowly extended in the course of three seconds; in the latter, the same movement was made abruptly and strongly, occupying not more than a quarter or a third of a second, and the characteristic "cogwheel" character of the resistance stands out with greater clearness in it than in the other.

The statement has already been made that the rigidity is practically universal in striatal cases; in the various divisions of the musculature it varies in degree only. It is found, therefore, in muscle groups which in pyramidal affections exhibit little or none of such hypertonia (see also below). Like one or two other phenomena of postencephalitic Parkinsonism, it may show a curious reversibility, fluctuating from time to time in an unexpected degree—a character not met with to the same extent in pyramidal cases. In deep sleep careful observations by my house physicians have proved it to be markedly reducible, frequently if not constantly. Cutaneous sensory stimuli exercise no apparent effect on its character; it is not temporarily "broken down" thereby, in contradistinction to what obtains in pyramidal disease. It seems to be aggravated by cold and reduced by warmth.

In spite of the plausibility of the view that muscle rigidity is mainly responsible for impairment of "voluntary" movement, I am not able to satisfy myself there is always a specific connexion between the two. I have not found that movement is always braked by the existing rigidity and brought to a standstill more or less completely and soon, as Foerster

FIG. 20.



Parkinsonism. Slow passive stretching of biceps brachii.

states. If the reader will refer back to the observations described in a previous lecture in this series he will gather that peripheral rigidity is only one, and that not necessarily the most important, of the factors producing limitation of range and power, and constituting "paresis," in respect of "voluntary" contraction. I have demonstrated the physiological normality of the mechanism of volitional innervation in regard to its muscular components, concomitant rigidity notwithstanding. We have had evidence to show that "voluntary" muscular contraction blends with existing tone and is rendered more tonic. Were the rigidity really to function as a constant and immediate brake on "volition" a difference might be expected between the curve of a rigid muscle under passive and active extension respectively, since in the latter the extension is part of a "volitional" action. By physiological (action-current) methods no such difference is discoverable. With cruder clinical technique the arm of a patient with severe paralysis agitans was fixed so as to prevent any subsidiary movement; the biceps brachii was in the first instance passively stretched, the time taken being roughly two seconds; another tracing gave active ("voluntary") extension of the same muscle, in the same time, and under the same conditions, and no distinction could be found. However, single instances must not be unduly stressed, and from this illustration, further, the inference is not to be drawn that hypertonia does not impede passive movement, for the reverse is the case. In analysis of the actual hindrance encountered by "volition" in the motor periphery due weight must be placed on the state of the antagonists, as we shall shortly see. This is of greater significance than hypertonia of the prime movers, though one might conceive so exaggerated a condition of agonist hypertonia that the incoming current of "volitional" innervation produces little or no evident result. No such case, as a fact, has as yet come under my notice.

FIG. 21.

Same case as Fig. 20. Quick passive stretching of biceps brachii; "cogwheel" phenomenon well seen.

A further word is necessary in this connexion as to the type of movement in which abnormal states of the musculature will produce its effect. From the observations made in the course of testing various kinds of movement, as described previously, the element of rigidity has been seen to contribute to the general imperfection in all; that is to say, it hampers movements of a "most automatic" kind no less than those that are "least automatic," as might, indeed, be expected. If there is a persisting background of agonist-antagonist rigidity, "volitional" innervation of a given muscular unit cannot differ from "automatic" innervation, since both use the final common path in a Sherringtonian sense. I have not found, therefore, in working on this class of case, that any support of a clinical kind is furnished to the contention of Kousnetzov, who says that in extrapyramidal hypertonia "it is above all the voluntary movements that are affected."

TREATMENT OF PHTHISIS WITH SANOCRYSIN.

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WHEN we began to use sanocrysin about six months ago in the University Clinic in Copenhagen for the treatment of some cases of chronic lung tuberculosis we were prepared to see serious consequences follow the sanocrysin injections in severe cases in view of the already published experiences. In the first few weeks we also had cases in which the reactions caused by the treatment could not be controlled, so that the patient succumbed before he otherwise would have done. We fairly quickly discovered, however, what the special dangers were and how they could be avoided, and in the last five months we have had no disasters of this kind. The treatment has thus been freed from the drawback which at first attended it, and we are now in a position to judge more soberly the therapeutic results we have attained during these months.

Dangers of the Treatment and How to Avoid Them.

Before giving an account of these results it is appropriate to discuss in rather more detail the dangers which may accompany the treatment. They are fully dealt with by Secher and Würtzen in the book, "Chemotherapy of Tuberculosis."[1] What is of special interest now is to realise that they can usually be avoided. It is the present purpose to discuss these from a purely clinical standpoint without

[1] THE LANCET, 1925, i,, 239, 555.

entering into the still hypothetical explanations of how they arise. Indeed, the whole question of the mode of action of chemotherapeutic substances is still far from being cleared up, and the same undoubtedly applies also to this new chemotherapeutic specific drug.

The greatest risk is the occurrence of the acute state of collapse described by Mollgaard as shock. It is characterised by a marked fall in temperature, the patient becoming pale, sweating, and showing signs of heart weakness with a very rapid and small pulse, and the gradual onset of cyanosis and other signs of cardiac failure. This is the condition which is combated in a very striking manner by the intravenous injection of antitoxic serum.

Our experience is that signs of shock are most likely to occur when an injection of sanocrysin is given while the patient still shows a febrile reaction from a previous injection. As a rule, a long febrile reaction, lasting from one to two weeks, where the temperature rises and falls fairly steadily, ensues after one or two sanocrysin injections. This reaction must be allowed to pass away before a fresh injection is given, and one must watch when it begins. By giving an injection too early, just when the fever is starting, the patient is exposed to the danger of shock, and even if this does not occur the reaction is increased in strength, so that it is more protracted and violent in every respect than it would otherwise be.

The same thing may happen if the patient is febrile before the first sanocrysin injection is given. If the usual dose is administered in such a case there is a risk of shock. One must either wait until the fever has disappeared or begin with a much smaller dose. In a case of acute tuberculous lobar pneumonia that came in with a temperature of over 40° C., we observed the occurrence of shock after a dose of only 20 cg. If one recognises these facts, shock can presumably be prevented, or at any rate, one will only get incipient shock, which can easily be controlled by an intravenous injection of antitoxic serum.

In order to avoid interfering with the long febrile reaction it is essential to bear in mind that in some cases it does not start before two to four days after the second sanocrysin injection, while in other cases it may appear after a single injection of only ½ g. In both cases a too early injection of another dose may be dangerous.

The danger resulting from the first injections of sanocrysin following too rapidly upon one another may, however, show itself in another manner than by the occurrence of shock. The fever reaction may become too severe and rise to a fatal hyperpyrexia. When we were first trying sanocrysin, in one case where three injections were given with only one day's interval, the temperature began to rise and without intermission reached 42° C., after which violent heart attacks and intestinal hæmorrhage occurred and death supervened.

From these facts it appears that the danger chiefly consists in the injections following too rapidly upon one another, with consequent accumulation. The same conditions also seem to reinforce the third variety of intoxication phenomena which in the form of anorexia, nausea, vomiting, and kidney disease nearly always appears during the treatment. The renal lesion manifests itself by albuminuria and casts in the urine. It seems as if the albuminuria appears in two different manners. It very frequently coincides with the long febrile reaction and is then usually of short duration, but it may also occur at a later stage of the treatment and may then last longer—weeks or even months. It is particularly this albuminuria occurring late that seems to follow too rapid injections. The longest attack of albuminuria that we observed appeared after three injections at intervals of only four days, and, in general, we have much more frequently seen severe albuminuria when the intervals have been four days then when the interval is increased to six days. Latterly, therefore, as a general rule, we have only given sanocrysin injections once a week, and we have sometimes been able to guard the patient against albuminuria throughout the whole course of treatment. The first two injections only may be given at, say, an interval of two or three days, if no reaction has already appeared. In carrying out the scheme of treatment it is very important to avoid albuminuria as much as possible, because another injection ought not to be given so long as it exists. Moreover, albuminuria is often accompanied by the other intoxication phenomena alluded to, which bring on a state of inanition, with a consequent large decrease in weight. On the other hand, it must be pointed out that the kidney disease is very benign, being chiefly a tubular lesion of a toxic nature, and that in all our cases it disappeared without leaving permanent damage. In a single case, however, there was still a trace of albuminuria after two months.

Although the effect of antitoxic serum in cases of shock has seemed to us very striking, it is more uncertain as yet how much action it has in warding off or arresting the albuminuria, at all events when it is given intramuscularly. The serum injections appear to be particularly ineffective against the late albuminuria, but they probably have an effect upon the kidney disease when it occurs along with the fever reaction at the beginning of the treatment. We have more and more given up the use of antitoxic serum except in shock, and we have tried to avoid albuminuria by increasing the interval between the individual injections in the manner indicated.

The Rationale of Treatment.

When one pays attention to these different factors in the administration of sanocrysin, the treatment is much more simple than it appears on reading the first clinical reports. In the ordinary cases of subfebrile or afebrile phthisis we are satisfied with the dose of 1–2 cg. per kilo suggested by Mollgaard, or more generally 0·5 g. for the first dose, 1 g. for the second dose two to three days later if no reaction occurs, and then 1 g. about once a week. In febrile patients one can begin with a lower dose—for example, half the quantity, and gradually increase it to the full dose of 1 g. In small women 0·75 g. will be sufficient. In cases with high fever it is advisable to begin with a dose of 0·2 g., and increase it very slowly.

Immediately after the injection the patient often feels indisposed and vomits, but this is purely temporary and does not last long. After this, the patient does not notice anything until the reaction caused by the drug occurs. The time which elapses before the reaction appears may vary from a couple of hours to one or even two days, and the first sign of the reaction is a rising temperature.

The rise of temperature, in the majority of my patients, has run a fairly typical course. After one or two sanocrysin doses a rise of temperature has occurred in the course of a few days, continuing for one to two weeks, exhibiting a more or less rapid rise and a steady fall to the normal again. This part of the temperature curve often shows a perfectly regular course in its rise and its lytic fall. The subsequent rises were, however, short ones, lasting as a rule only one day, the temperature falling to normal again the day after or in a few days' time, and they get smaller and smaller for each injection, and finally cease.

A rash usually appears during the first long temperature rise. It first takes the form of a morbilliform exanthema which, however, soon becomes general and confluent, so that in the course of a day or two it looks like a scarlatinal rash. The eruption persists for a few days to a week and then disappears without leaving any trace. There is commonly no exanthema or at any rate only a slight and evanescent one after the subsequent short reaction. During the long fever reaction there is frequently general malaise with nausea and anorexia, and sometimes vomiting. In other cases the general condition is very little affected. More or less pronounced pain and tenderness

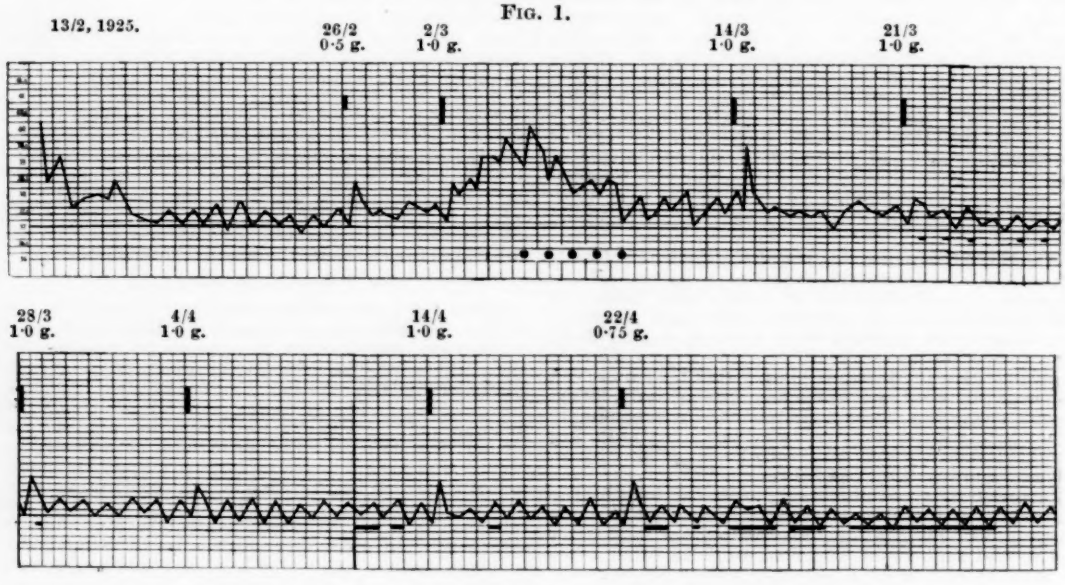
of the joints often occurs during the first fever reaction, passing from joint to joint just as in rheumatic fever.

The accompanying curve illustrates such a typical fever reaction in a case where no serum was given (Fig. 1).

In other cases, however, the fever reaction is less typical, and takes the form of a rapid rise in temperature which in the course of a few days drops to normal, and the long fever reaction referred to is not seen. In many cases the fever reaction is, on the whole, very slight and may even be entirely absent. This is seen especially in old cases of chronic fibroid phthisis. In fresh cases the reaction, on the contrary, may be much more severe, and in a few cases we have seen the long fever reaction recur once or twice, troublesome and extensive desquamating dermatitis during the treatment which, however, disappeared in all cases with suitable local applications. It appears to be quite distinct from the typical initial exanthemata. The cases are much like the dermatitis sometimes seen after treatment with salvarsan.

With the cautious treatment described we have only observed very mild local phenomena. The expectoration became rather more profuse at first, and sometimes more râles were heard in the affected parts; these local reactions may be entirely wanting. We have not witnessed any real lighting up of the tuberculous lesion in the lungs during the treatment. In two cases, however, an exudative pleurisy occurred. On another occasion otitis media developed, but a

FIG. 1.



The thick horizontal line indicates albuminuria; the thick perpendicular line, injections of sanocrysin; and the black dots, exanthema.

sometimes associated with swelling and tenderness of the lymphatic glands of the neck. In some cases, as mentioned, albuminuria and casts in the urine occur even during the long fever reaction, in others albuminuria does not appear until after the subsequent sanocrysin injections. While albuminuria is present the nausea and anorexia are more marked.

From our experience up to the present, therefore, the treatment with sanocrysin resolves itself into a short series of injections whose effect on the patient's temperature normally diminishes with each injection. At latest after the seventh to eighth injection the patient, as a rule, does not react at all to the injections or at any rate does so only with a slight rise in temperature. The treatment is then at an end for the time being, but can be repeated after a longer or shorter pause. When we have repeated the injections of sanocrysin after an interval of one or more months we did not observe typical temperature rises as in the first treatment, but, at most, a small rise lasting one or two days or else no reaction at all.

As has been said, the patients are subject to unpleasant subsidiary effects in various ways during the treatment. Even in the absence of these the patient's general condition is often rather badly affected, as shown by the more or less marked loss in weight, which may be very considerable and reach 5–10 kg. or more. When the treatment is over the patient usually quickly recovers and there is a rapid increase in weight. In a few cases we saw very chance occurrence cannot in this case be absolutely excluded.

Results of the Treatment.

Passing now to the question of what effect we observed in the patients we treated, it must, first of all, be stated that the experiences recorded here refer exclusively to cases of ordinary chronic lung tuberculosis—the true lung phthisis. It seems to be here that sanocrysin has its useful field, while the disease, if localised in other parts, especially the so-called surgical tuberculosis, does not appear to be affected in the same way. In a certain number of the patients the favourable effect was very striking, in others it was more doubtful, and in some it could not be detected. We will, for the present, deal specially with the first group and indicate what morbid phenomena we found to be improved after a few months' treatment. We may first cite changes in the general condition, especially cessation of the febrile or subfebrile state and accompanying weakness and asthenia, from which practically all the patients suffered a little on admission. It is, however, obvious that a subjective element enters into the estimate of the condition to a marked degree here.

Of more importance are the objective changes as revealed by the stethoscope, particularly the disappearance of râles or an alteration in their character from the moist râles which are characteristic of fresh progressive processes to the scanty, dry, and sibilant sounds which often persist long after the processes

have become quiescent. Finally we have observed as an important sign of improvement that the expectoration, which originally contained bacilli, continues to be free from them, or that all the expectoration has disappeared. On admission, the majority of our patients had an excessively large number of the bacilli in the sputum. After a few injections the numbers decreased very greatly in almost every case, and this was followed by a period when no bacilli could be found by ordinary examination while a few could be detected by the antiformin method. Lastly, the bacilli were constantly absent in a series of examinations, and in most cases did not appear again in the months following the treatment.

Of special importance in estimating the activity of sanocrysin, however, are the changes that can be followed in skiagrams, and I should think that this is a field where a thorough study would prove very profitable for the elucidation of the rationale of sanocrysin treatment and the indications for it. In his experiments on calves Möllgaard saw the acute, chiefly pneumonic, exudative changes in the lungs disappear under sanocrysin treatment, while the miliary tubercles underwent regressive changes much more slowly. Something very similar can be observed in the clinic when one attempts to bring to light by an X ray examination the anatomical changes which take place in the lungs during the treatment. Thus the extensive and rapid changes that can be seen to take place in fresh, largely exudative (pneumonic) processes are striking. Extensive and confluent shadows in the skiagrams can be seen to clear up and disappear while the stethoscopic signs diminish and die out. But also in the mainly productive forms we have seen very pronounced changes. It must be remembered that ordinary chronic phthisis exhibits anatomically a varied picture of exudative-alveolar, more cellular-productive, and purely fibrous lesions. More or less clearing up of the shadows is a frequent and striking phenomenon in all the forms when the skiagrams are compared as the treatment gradually progresses, but at the same time signs of fibrous and cirrhotic processes become more and more evident. The striped and meshed patterns become more pronounced, while the more diffuse soft shadows decrease or disappear.

Summarising the changes seen in the X ray pictures it may be said that they are the same as occur in chronic phthisis which, with appropriate treatment, becomes quiescent and is continuously transformed into typical fibroid phthisis. All the signs of fibroid processes which we are familiar with in skiagrams of phthisical lungs become more and more marked. The fibroid stripes and interlacings quite dominate the picture. But with sanocrysin treatment all this development takes place rapidly in a few months in favourable cases, while with our previous treatment it took years to obtain a similar result.

After the experiences described one would assume that the sanocrysin treatment would be specially effective in recent, not too extensive processes, particularly of an exudative, pneumonic character. This is undoubtedly correct. It is in cases similar to these (as will be seen) that in several instances we apparently obtained at least a temporary cure when the cases were not too acute with high fever. The same does not apply, as might be expected, to the very extensive processes found in phthisical patients who for some years have had a steadily progressing lesion in the lungs, nor to the absolutely chronic cases which must be classified as mainly fibroid phthisis.

We have had little experience of the progressive, continuously febrile cases of phthisis because we regard them as temporarily less suitable for treatment with sanocrysin, but in the severe cases which only have a very slight temperature rise we have in some cases seen remarkably good results even with very extensive lesions, while other cases were not much influenced, so that the processes could not be arrested.

When good results are seen in these one to two-year-old cases of extensive lung tuberculosis they are of the same nature as in the recent cases. The stethoscopic signs diminish, marked clearing-up of the X ray picture is observed, and the general condition is improved, although the sputum still contains bacilli. Usually, however, the number of bacilli in the sputum speedily decreases very considerably and they frequently disappear for a long period, but after one or two months they have appeared again, although in diminished numbers. In cases of cavernous phthisis it is not surprising that it is difficult to rid the sputum of bacilli.

In the old cases of fibroid phthisis of several years' standing one sometimes sees very striking improvement, and in these we have frequently seen the bacilli entirely disappear from the sputum during the treatment. At the same time, the general condition is very markedly improved, although the stethoscopic and X ray changes in these patients are less pronounced. In one of these old cases of fibroid phthisis we have seen the bacilli appear again in the sputum after some months complete freedom from symptoms. Other cases, in spite of freedom from bacilli, continued to have a cough and bring up sputum.

The cavities demonstrated by stethoscopy and X ray pictures deserve special mention. In some cases we saw very characteristic ring-shadows form during the treatment. As is recognised, it is difficult to decide whether this is due to the cavities showing up more distinctly on account of the clearing up of the surrounding tissue, which is seen to occur simultaneously, or whether it is a question of development of a local pneumothorax. At any rate, in one case the latter was definitely present. In other cases we observed a diminution and contraction of the cavity.

Summary of Results.

Our material of tested cases is too small and too heterogeneous to give statistics of the results obtained, and we are still far from arriving at a final result. The best impression of the value of the specific is obtained by carefully watching the individual patients during the treatment.

We will, however, give an account of the results of the treatment obtained in 42 patients where the disease was so far advanced that an estimate of its effect could be formed. Eight of these must be regarded as cured in that all subjective signs of the disease have vanished; the sputum, if still present, is always free from bacilli, the râles have entirely or almost entirely disappeared, and X ray examinations show considerable changes in the way described. Most of these patients have left the hospital for several months and feel absolutely well. Another group of 17 patients has shown signs of very considerable improvement subjectively and objectively. Some of them are free from bacilli (eight), four others show only very few bacilli with the anti-formin method. Stethoscopic examination, especially, shows a marked decrease in the extent and number of râles.

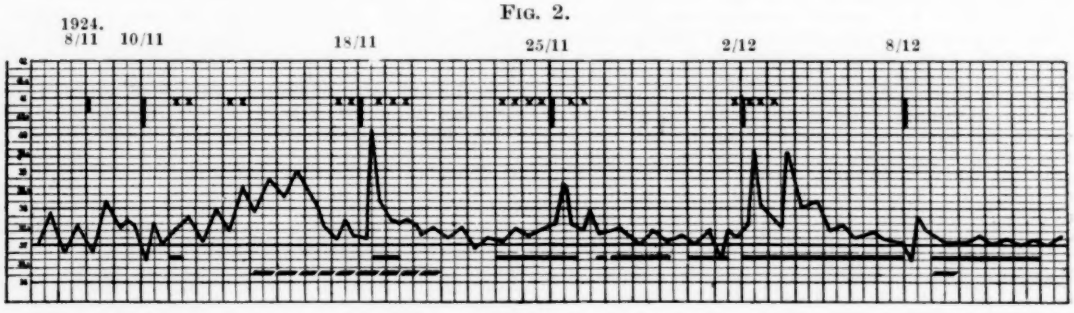
A third group comprises nine where the treatment cannot be said to have done any positive good, for after nearly six months' treatment the patients have still signs of active phthisis, which with some of them is practically unchanged and with the rest only shows signs of moderate improvement. Lastly, in six cases the disease has not been arrested by the treatment but has rather tended to spread as time went on. Two of the patients have got a pleurisy, another a tuberculous otitis media. We shall add that during the last five months we have had no deaths among the treated cases of phthisis.

As already emphasised, data such as these have, however, a limited value only. The chief point to us is whether it can be proved that the drug has a true specific action in certain cases in such a way that results can be arrived at, which it has not hitherto been possible to obtain by any other method

of treatment. In many cases improvement or a relative cure can, of course, be obtained also by sanatorium treatment or by inducing pneumothorax, but with the sanocrysin treatment we have observed take place in a number of cases such rapid and distinctly favourable changes as could not, in our opinion, have been attained in any other way.

Line, K. Cl., 26 years old. Married to a farmer. Admitted on Nov. 4th, 1924; discharged on Dec. 21st, 1924. A sister died of tuberculosis of the lungs when the patient was 5 years old. Another sister had tuberculosis of the lungs 30 years ago but is now well. The patient was healthy until nine months ago, when she got cough, weakness, night sweats, and fever. Tubercle bacilli were demonstrated in the sputum. There was hoarseness now and again.

FIG. 2.

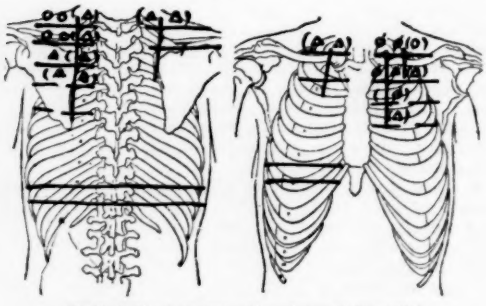


The thick horizontal line indicates albuminuria; the thick perpendicular line, injections of sanocrysin, 0·5 g. given on Nov. 8th and 1·0 g. on the subsequent occasions; the crosses, injections of 20 g. antitoxic serum; and the interrupted line, rash.

According to our experience the cases best suitable for treatment with sanocrysin are cases of phthisis where the infection of tuberculosis has appeared in the course of the last year. In reality we have in 65 per cent. of such cases been able to observe good results, and all the really cured cases belong to this group. Much more uncertain are the results in the very frequent cases of older and extensive disease, and especially when they are in a feverish and progressive phase of the disease.

Of course, one must be prepared to find that there are many cases where no benefit can be derived from the treatment, and also that the treatment will prove injurious in some cases when used without caution. In patients who have had marked signs of phthisis for some years it will often be questionable whether the disadvantages and length of the treatment do not outweigh the benefit which can be expected to ensue. As, however, we have seen quite astonishing improvement in some cases of this type the indications for sanocrysin treatment cannot as yet be laid down with any degree of certainty.

FIG. 3.



Radiological examination, Nov. 11th, 1924.

A Successful Case Narrated.

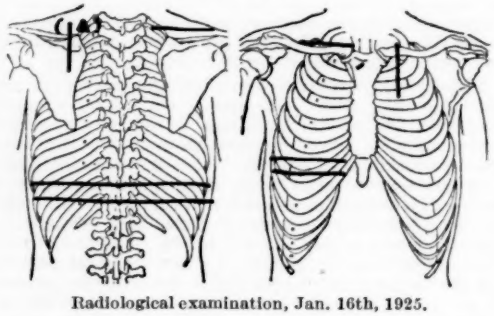
We add the history of a clinical case. Our intention is only to show that sanocrysin can really exercise a specific action. Not until later on can the final results and the indications for the treatment be determined. It is probable also that the method may be further developed so as to extend its sphere of usefulness and to avoid the inconveniences and dangers which are still attached to it.

Condition on admission.—General condition good. Temperature on Nov. 5th, 37·9°–37° C.; on the 6th, 37·6°–37°; on the 7th, 37·9°–36·8°. Appetite good; slight cough; sputum scanty; T.B. present. Urine: no albumin; hæmoglobin, 82 per cent. Height, 156 cm. Weight, 50·5 kg. Stethoscopic examination on Nov. 4th:—Left lung: In almost all the upper half there were signs of active disease: dullness, bronchial breathing, and numerous fine and medium fine, mostly moist, râles. Right lung: In the supraclavicular and supraspinous regions there was a slight dullness, bronchial breathing, and fine, moist râles on coughing.

Treatment with sanocrysin. No serum injection until after the second dose. Six injections consisting of a total of 5·5 g. Nov. 8th, 0·5 g.; 10th, 1 g.; 18th, 1 g.; 25th, 1 g.; Dec. 2nd, 1 g.; 8th, 1 g. The temperature is recorded in curve (Fig. 2).

Stethoscopic examination after termination of the treatment on Dec. 21st, 1924. Left lung: Dullness unchanged over almost all the upper half, but only bronchial breathing in the supraspinous region and in the front of the chest to the second rib. The râles had disappeared very considerably in numbers and in extent, and were now heard only in the supraspinous region and as far as the second rib in front. No moist râles, but only dry and partly dry ones were now heard only on coughing. Right lung: Slight dullness over

FIG. 4.



Radiological examination, Jan. 16th, 1925.

apex as on admission, bronchial breathing over apex in front without râles, and bronchial breathing behind in supraspinous region accompanied by a few partly dry, medium-fine râles with the first cough.

Weight: On Nov. 4th, 50·5 kg.; on 11th, 51·7 kg.; on 22nd, 50·5 kg.; on Dec. 7th, 48 kg.; on 16th, 47·7 kg. The urine contained up to 3 per cent. albumin periodically. Last trace on Dec. 13th (Fig. 2).

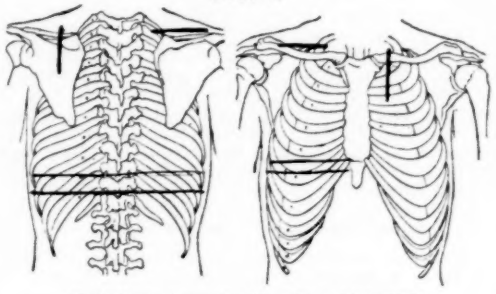
Only a few bits of sputum. Latterly only a single mucopurulent pellet every three or four days. On Nov. 8th, T.B. +; on 25th, T.B. +; on Dec. 9th, T.B. −; on 17th,

T.B.—. Pirquet reaction: On Nov. 21st, +; and on Dec. 18th, +. General condition on discharge excellent. No more weakness. Temperature normal.

Twenty-five days later was again in hospital from Jan. 15th to 25th, 1925. General condition continued to be good. Temperature normal. No albuminuria. No cough or expectoration. On stethoscopic examination on Jan. 16th only a few dry râles were heard on coughing in the left supraspinous region, otherwise there were no râles. There was no longer bronchial breathing at left apex. Bronchial breathing at right apex over clavicle and spine of scapula. On Jan. 24th practically no râles could be heard.

The skiagrams (represented schematically in Figs. 3, 4, and 5) showed a shadow composed of patches partly

FIG. 5.



Radiological examination, Jan. 24th, 1925.

arranged in groups in the upper two-thirds of the left lung, and some retraction of the apex of the lung. On the right side there was diffuse darkening of the apex. After the cure the skiagram showed that both apices had cleared up, and, on the whole, only indefinite and rather doubtful changes were present.

The patient came in with subfebrile phthisis which had produced symptoms for nine months. A stethoscopic examination showed signs of fresh tuberculosis in the upper half of the left lung with numerous fine, moist râles. In the right apex there were a few fine, moist râles. During the treatment the râles disappeared gradually and on discharge, seven weeks later, there were only some scanty, dry, and medium dry râles in the left apex and a few in the right. Twenty-five days after discharge only a few râles were heard in the left apex and a week later none at all. The bronchial breathing in the left apex had also disappeared, but there was still bronchial breathing over the right clavicle and spine of the scapula. General condition was excellent. The weight increased, and a month after the treatment was started bacilli could no longer be found in the sputum. The X ray examination showed a clearing up of the shadows at the apices in conformity with the stethoscopic investigation. The patient must be regarded provisionally as cured by the treatment.

Conclusions.

From our present knowledge I think we can formulate the following preliminary conclusions about the sanocrysin treatment: (1) Sanocrysin has a specific curative action on tuberculosis of the lungs. (2) It does not seem to have the same effect on extrathoracic localised tuberculosis (surgical tuberculosis, meningitis, &c.). (3) It is very effective on fresh tuberculosis of the lungs that has been manifest less than one year. (4) In older cases the effect of the treatment is uncertain. (5) It is difficult to use it in febrile cases, but some good results may be obtained in old cases of apyretic fibrous phthisis. So far it has not been able to cure acute lobar tuberculous pneumonia. (6) In ordinary cases a treatment lasts three to four months. (7) Generally the dangers may be avoided when the treatment is carried out in the right manner and with caution. (8) The antitoxic serum has a curative effect on acute shock. Its effect in preventing albuminuria is not clear, and further investigations are necessary.

CHOLECYSTOGRAPHY IN ITS APPLICATION TO THE DIAGNOSIS OF CHOLECYSTIC DISEASE.*

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DURING the last 15 months more than 1100 patients have been examined at the Mayo Clinic by cholecystography. The sodium salt of tetrabromphenolphthalein and that of tetraiodophenolphthalein were used, and each salt was administered orally and intravenously.

Sodium-tetrabromphenolphthalein: Intravenous Administration.

One hundred and seventy-eight patients were given sodium-tetrabromphenolphthalein intravenously. The patients were hospitalised and kept under strict dietetic regimen during the period of examination. The dye was given in a standard dose of 4·5 g., dissolved in 40 c.cm. of triple distilled water, sterilised for 15 minutes in a boiling water-bath and cooled for use. It was administered in two equal portions one-half hour apart, and injections were made slowly, from five to seven minutes being consumed. The median basilic vein was used when possible. Rontgenograms were made as a routine at the fifth, eighth, and twenty-fourth hour after giving the dye.

Notwithstanding the precautions mentioned, more than half the patients experienced systemic reactions in varying degree. In most cases the symptoms were trivial, but in 10 per cent. the reaction was marked and in 2 per cent. severe. The typical severe reaction began within five or ten minutes with a sense of uneasiness, followed by pain in the dorsal and lumbar region, flushing of the skin, and a rise of from 10 to 50 mm. in blood pressure, followed within three to five minutes by a sharp fall. With the fall of blood pressure, patients sometimes had intestinal cramps, nausea, vomiting, or incontinence of the bowel and bladder. Milder reactions were characterised by flushing of the skin, slight pain in the back, and transient nausea. Occasionally a delayed reaction developed four or five hours after injection.

Normally, with this test, as Graham first pointed out, the gall-bladder will retain sufficient dye to cast a shadow at the fourth or fifth hour after administration. This shadow attains its greatest intensity some time between the eighth and twenty-fourth hours, becomes progressively thinner thereafter, and usually disappears between the twenty-fourth and forty-eighth hours. The shadow is regular in contour and homogeneous. It varies in size and is commonly larger at earlier than at succeeding hours. Abnormal responses include failure of the gall-bladder to fill with the dye, persistent faintness of the shadow, delayed filling, marked delay of emptying, deformity of contour, unvarying size of the shadow, and mottling, or central defects.

Thirty-nine patients of this series were operated on. All proved to have disease of the gall-bladder, and 25 also had stones. In 19 of the 25 cases with gall-stones the gall-bladder failed to fill with the dye; shadows of the gall-stones themselves were visible in only six cases of the 19. Dye entered the gall-bladder in six cases, but in two of these the shadow was mottled with transparencies; in one the denser shadow of stones was seen within that of the gall-bladder; and in one the gall-bladder was faintly depicted at the eighth hour only. In only two cases of the 25 could the findings be construed as negative. A definite lesion of the gall-bladder without stones was found at operation in 14 cases. In eight of these the gall-

* Abstract of a paper read at the Section of Radiology, Subsection Diagnostic Radiology, International Congress of Radiology, London, July 1st, 1925.

bladder failed to fill with the dye. Its shadow was visible at the twenty-fourth hour only in one case, and at the fifth and eighth hours only in two others. No abnormalities were observed in the remaining three cases.

Sodium-tetrabromphenolphthalein: Oral Administration.

The bromine salt has been given orally to more than 800 patients. No preparation of the patient is required. The dose is proportioned to the body-weight and ranges from 4 to 7 g. It is given in ordinary gelatin capsules containing a gramme or a half gramme each. The patient is instructed to take the capsules at intervals during the evening meal, drinking water freely, and present himself without breakfast for the examination next morning at 8 o'clock. Rontgenograms are made at the twelfth, fifteenth, and twentieth hours after the dye is taken.

Reactions following oral administration of the bromine compound have been relatively few and never grave. Occasionally complaint has been made of nausea, a few patients have vomited, and in rare instances catharsis has occurred. Shadows of the gall-bladder obtained by the oral method are commonly less dense than those observed after intravenous administration. In about half the normal cases the shadow disappeared by the twentieth hour. Otherwise the principles of interpretation and the distinctions between normal and abnormal responses to the test are the same for both methods.

One hundred and forty patients of this series have been operated on. At operation 71 patients were found to have gall-stones. In 36 cases of this group no shadow of the gall-bladder had been seen; shadows of the stones were evident in seven of the 36. A faint shadow of the gall-bladder was noted in 15 cases. Mottling of the shadow by stones was observed in 15 cases. In five cases the response to the test was normal. Marked disease of the gall-bladder, without stones, was discovered at operation in 33 cases. In 16 of these the gall-bladder had failed to cast a visible shadow with the dye, and only a faint shadow was seen in 11. In five cases the rontgenological findings were considered to be normal. The third group comprised 17 cases in which the gall-bladder when removed revealed pathological changes of minor degree. At the rontgenological examination the gall-bladder had failed to cast a shadow in seven and responded normally in ten. In the fourth group of 19 cases the gall-bladder was explored in the course of operation for other lesions and adjudged to be normal. No abnormality had been discovered at the rontgenological examination in 16 of them. In three cases no shadow of the gall-bladder was visible.

Sodium-tetraiodophenolphthalein: Oral Administration.

Sodium-tetraiodophenolphthalein was given orally to a limited series of patients. The standard dose was 0·08 g. for each kilo of body-weight, but not in excess of 6·6 g. to a patient. Both enteric-coated pills and plain gelatin capsules were tried. Almost all the patients who received the pills experienced purgation, vomiting, or nausea. These disturbances occurred less often from the capsules, but more frequently than from the bromine salt. Rontgenograms were made at the same periods and under the same conditions with respect to fasting as in the oral method with the bromine salt, and the same criteria were applied in interpretation.

Up to the present 25 patients have been examined with the iodine salt by mouth. Three have been operated on. All three had given normal responses to the test. In two cases the gall-bladder was accounted to be normal on surgical exploration in the course of operation for other lesions. In the third case the gall-bladder was removed, but only minor pathological changes were found.

Sodium-tetraiodophenolphthalein: Intravenous Administration.

Patients to whom the iodine salt was given intravenously were not hospitalised, but were subjected to the same dietetic regimen as those who received the bromine salt intravenously, and rontgenograms were made at the same periods. A dose of from 3 to 3·5 g. was given, dissolved in 28 c.cm. of triple distilled water, and administered at one sitting. Preparation of the solution was identical with that of the bromine salt. No reactions occurred, and this was ascribed in part to exceptional purity of the drug. The shadows obtained were somewhat denser than those obtained with the bromine salt.

This series comprised 32 patients, of whom 11 have been operated on. Three of these patients had gall-stones; in two cases there had been no shadow of dye in the gall-bladder, and in the other the shadow was mottled. Five patients had marked cholecystitis without stones; in three the gall-bladder had not been depicted with the dye, while in two the shadows were normal. Slight disease of the gall-bladder was discovered in three cases; in two the rontgenological examination had been negative, and in the third case the shadow was faint.

Rationale and Weight of Signs.

Among the cholecystographic phenomena indicative of disease, failure of the gall-bladder to fill with the dye in sufficient quantity to cast a shadow seems to rank first in frequency and to be unexcelled in diagnostic value. Scarcely less reliable is constant faintness of the shadow. Potential causes of complete absence or persistent faintness of the shadow are of two types—namely, those which interfere with entrance of the dye-laden bile into the gall-bladder, and those which interfere with concentration of the bile. A stone obstructing the cystic duct or a large volume of stones, sand, or abnormally thickened bile in the gall-bladder should mechanically exclude or impede entrance of bile carrying the dye. Empirically, at least, this association has been found repeatedly. Swelling of the mucosa of the duct, spasm, or constricting adhesions would logically also have this effect.

Cirrhosis or other grave disease of the liver might hamper excretion of dye in the bile and thus lead to an error of interpretation, but I have encountered no such instance. It is difficult to appraise the effect of hepatitis alone because many other factors are involved and it is a common accompaniment of cholecystic disease. Rosenthal's experiments tend to show that the liver has a large "factor of safety" and that extensive damage is required to impair hepatic function. At all events, in some cases of this series, in which hepatitis and cholecystic disease were associated, the gall-bladder was normally visualised.

An increase of intensity followed by a diminution is the usual normal finding. This definite order is hardly to be expected always, as it may possibly be modified by the drug used, the method of administration, variation in the period of rontgenography, or failure of the patient to comply with directions as to taking food. Mottling of the shadow demands some caution in interpretation. When produced by stones which are denser than the dye there is little chance of error. Mottling due to transparent cholesterin stones is sometimes fairly characteristic in appearance. In many instances, however, the shadow-defects are not markedly different from those caused by gas in an overlying segment of bowel, and this source of error must be guarded against. Papillomas, if of sufficient size, should also produce mottling.

Unvarying size of the shadow at all periods may be construed as evidence that the gall-bladder lacks normal elasticity. If, however, the intensity of the shadow varies and is fairly pronounced at any time, unchanging size loses force as an index of disease, and one would hardly venture to base a diagnosis on this sign alone.

By all the methods described the normal gall-bladder seldom fails to cast a shadow on the first films made. After intravenous administration of the dye a shadow usually remains at the twenty-fourth hour. After oral administration the gall-bladder may or may not be empty of dye by the twentieth hour. Differences between the food regimen of the two methods probably account for the disagreement. Moderate delay of filling or emptying, or acceleration of either may have a significance which will be learned with experience. At present one is obliged to construe such minor abnormalities with reserve.

Local deformities of contour were rarely observed in this series. In one case a slight flattening of the fundus seemed unrelated to the pathological changes found at operation. In another the fundus was very pointed, but the gall-bladder was deemed to be normal on surgical exploration. Adhesions about the gall-bladder were present in several cases, but no deforming effects on the shadow were noted, although such a possibility is obvious.

Apparently least significant of all factors is the position of the gall-bladder. In persons of the slender habitus it is usually situated low and mesially, while in those of the broad habitus it is likely to be placed high and laterally.

Errors of Diagnosis.

The affirmative diagnoses of disease appear to be well sustained, and there were few disappointments in the series. Negative findings with the dye tend to be somewhat less reliable. Occasionally a definitely diseased gall-bladder will respond normally to the test. Even the shadow of a gall-bladder containing stones may sometimes have normal characteristics in general. The most serious obstacle to the accuracy of a negative diagnosis is the gall-bladder in which are only minute pathological changes, probably a residue from more pronounced disease in the past. Such a gall-bladder more often responds normally to cholecystography and may be apparently normal on surgical exploration. If the history warrants its removal, it will seldom fail to reveal at least microscopic evidence of disease.

Comparison of Methods.

Intravenous administration of the dye offers advantage in superior control of the patient, certainty that the specified dose of the drug has been given, and emphasis of the shadows obtained. Its disadvantages are the requirement of a punctilious technic and the hazard of local or systemic reactions. With identical technics the bromine salt given intravenously seems to be more provocative of systemic reactions than the iodine salt, if the latter is pure.

Simplicity and freedom from grave reactions are the principal advantages of oral administration. With either salt, nausea and purgation ensue occasionally. The iodine combination, even when pure, seems to produce these discomforts more often than the bromine. Vomiting after taking either drug, unless early, has apparently had no material effect on the shadow. Dye in the intestinal contents produces shadows which may be a little confusing and might possibly conceal the shadow of the gall-bladder, but such circumstances are infrequent. Lack of certainty that all of the drug has been taken as directed is another minor objection. The question may also arise as to whether defective absorption from the intestine may not be a cause of abnormal findings. However, all these objections and doubts seem to have little basis, for in this series the diagnostic results from all methods have been about equal.

From these considerations it will be apparent that my present preference is for the oral use of the bromine salt as a routine, and the iodine intravenously to check doubtful cases.

ANURIC DIABETIC COMA.

BY A. CLARKE BEGG, O.B.E., M.D., CH.B. EDIN., M.B. LOND.,
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THE exact cause of diabetic coma is still doubtful, but it is regarded as the end-result of acidosis and due, directly or indirectly, to the accumulation of acetone bodies in the blood. All the authorities take this view though they recognise various clinical varieties. For instance, Tidy [1] gives three types: (1) Dyspnœic; (2) alcoholic; (3) a type with collapse. Osler [2] gives a somewhat similar classification. Even Joslin [3] in his classical book regards acidosis as the essential factor in diabetic coma, although he speculates about two cases with anuria which obviously fall into the renal or anuric type which I am about to describe. Graham [4] goes a step further and describes two main types—viz., with well-marked hyperpnœa and without obvious hyperpnœa—but does not show the essential differences between the two types. MacLean [5] admits that it is possible to have diabetic coma in which the tests for acidosis give practically normal results, but he draws no distinction between the nature and course of the disease in these cases and in the ordinary acidosis cases.

Clinical Types of Coma.

Until the advent of insulin it did not much matter how one classified cases of diabetic coma—practically all were fatal. With the aid of insulin, however, the cases of ordinary, frank diabetic coma usually responded to treatment in a marvellous way, but very soon one was discouraged to find that certain patients died in spite of the new treatment. I noticed that the patients who died were those who had little or no acidosis, and as far back as December, 1923,[6] I recognised two distinct types: (1) ordinary type associated with acidosis, which, as a rule, recovered with insulin treatment; and (2) type with little or no acidosis ("post-operative type"), all of whom died in spite of the most energetic treatment. I recorded three cases at that time and since then I have had five others, four of whom died. Thus out of eight cases of this type seven have died. With the help of Dr. Milligan and Dr. Lindsay, my house physicians, to whom I am greatly indebted, the cases were observed very closely and we found that with insulin treatment any slight acidosis present was easily abolished, the urine was rendered sugar-free, and the blood-sugar was brought down to normal limits. Instead of corresponding clinical improvement, however, the patients became worse, and they secreted less and less urine until there was *complete anuria* before death.

In all these cases there was some albumin in the urine and usually a few casts. The concentration of urea in the urine was usually low and in the blood invariably high; in one case it reached 206 mg. per 100 c.cm. There was seldom noticeable thickening of arteries or high blood pressure. Most cases were of some standing, but one, a young man, gave a history of only two to three weeks' illness. The blood-sugar was always very high. Clinically, the most prominent symptoms were vomiting, restlessness, and feeble, quick pulse. The type of respiration varied, sometimes Cheyne-Stokes, never typical air-hunger. Little or no smell of acetone in the breath, but the tension of the eyeballs was lowered as in coma of the ordinary type. Sometimes there was quiet delirium, but never twitching of muscles or epileptiform convulsions. Usually some amount of consciousness was retained till very shortly before death.

Cause of Anuric Type of Coma.

What is the cause of the coma in such cases? It cannot be acidosis, neither can it be the mere excess of blood-sugar, for as great an excess may be present without coma; and, moreover, the blood-

sugar may be reduced to normal with insulin and yet no improvement result. It is possible that the essential cause is the production of some unrecognised toxin resulting from the faulty metabolism in diabetes. Whatever the primary cause, it soon became clear that the immediate cause was some kind of defective action of the kidneys. Two constant features were very high blood-urea and diminished secretion of urine, ending in complete anuria. The natural suggestion then was that the coma was due to uræmia, but against this were the facts that beyond slight albuminuria many cases showed no evidence of inefficient kidneys up till the onset of coma, while the symptoms were different from those commonly found in uræmia. They resembled much more the symptoms of so-called urinæmia, found in obstructive suppression of urine, in which the severe and acute mental disturbances, the sudden amaurosis, and the epileptiform phenomena in general of uræmia are lacking.

We had opportunities of doing post-mortem examinations in several cases, and my thanks are due to Dr. A. F. S. Sladden and Dr. Milligan for their help in this connexion. Certain changes were found which suggest that the kidney is an all-important factor. Dr. Milligan is at present engaged in a research on this question which I am sure will be of great value.

Prognosis and Treatment.

Meanwhile, it is very desirable that these cases should be recognised clinically. First for prognosis. If a patient in diabetic coma shows abundant glycosuria with high blood-sugar and high blood-urea, absent or slight ketonuria, but with a trace of albumin in the urine, the prognosis is very grave. Up till a short time ago I would have said that it was hopeless, as my first seven cases all died, and this in spite of all kinds of treatment for the suppression of urine in addition to the ordinary treatment of diabetic coma. Recently, however, I have had one case which recovered. The only difference in the treatment of this case was that two pints of normal saline were given subcutaneously *at the outset*, and four pints more were introduced during the first 24 hours. Whether this was the determining factor in recovery is, of course, doubtful, but as it is the only case which has recovered, I would advise this treatment being carried out at once in any similar case. Of course, all the other cases had saline administered, but the rectal route was usually tried first before resorting to the subcutaneous or intravenous method, and possibly valuable time was thus lost. It is important, therefore, both for prognosis and treatment, that this variety of coma should be recognised as soon as possible and the most energetic treatment given without delay. This warning is the more necessary, as cases of this kind often appear to be of less severity than the ordinary cases associated with marked acidosis.

Summary.

To summarise, the points common to both varieties of coma are: (1) Drowsiness going on to coma; (2) vomiting (usually) and constipation; (3) lowered tension of eyeballs; (4) raised blood-sugar; (5) glycosuria; (6) tendency to heart failure.

The differences between the two types are:—

Ordinary Diabetic Coma with Acidosis.—(1) Blood: Blood-sugar moderately high; blood-urea about normal. (2) Urine: Good quantity and soon increases with treatment; much acetone and diacetic acid; no albumin (usually). (3) Clinical: Coma usually deep some time before death; air-hunger marked; odour of new-mown hay in breath. (4) Prognosis: Insulin treatment usually cures.

Diabetic Coma with Absent or Slight Acidosis.—(1) Blood: Blood-sugar very high; blood-urea very high. (2) Urine: Usually small quantity going on to complete anuria; little or no acetone or diacetic acid; some albumin. (3) Clinical: Coma often not deep till just before death; air-hunger absent or slight; no odour of new-mown hay in breath. (4) Prognosis: Usually fatal from anuria.

Whether this type of diabetic coma without acidosis is a distinct entity is doubtful, as some of the cases began with the typical signs of ordinary diabetic coma, and it was only when the acidosis had cleared up under treatment, without corresponding clinical improvement, that they showed themselves to be of the definite anuric type described above. Be that as it may, it is certain that as regards symptoms, physical signs, course and prognosis, it is a distinct clinical type and that the immediate cause of death is suppression of urine.

The condition might be called diabetic coma of the renal type, but until further knowledge is gained the most suitable name would appear to be "anuric diabetic coma." This has the advantage of emphasising the outstanding symptoms of the disease and the one for the relief of which all our energies have to be directed.

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1. H. L. Tidy: Synopsis of Medicine.
2. W. Osler: The Principles and Practice of Medicine.
3. E. P. Joslin: Treatment of Diabetes Mellitus.
4. G. Graham: Price's Text-book of the Practice of Medicine.
5. H. MacLean: Modern Methods in the Diagnosis and Treatment of Glycosuria and Diabetes.
6. A. C. Begg: Insulin in General Practice.

THE TECHNIQUE OF SPLENIC PUNCTURE IN THE DIAGNOSIS OF KALA-AZAR.

BY PHILIP MANSON-BAHR, D.S.O., M.D. CAMB., F.R.C.P. LOND.,
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SPLENIC puncture, as a means of clinching the diagnosis, is essential in kala-azar. By some this procedure is regarded with a certain measure of apprehension on account of the risk of lacerating the splenic capsule and thereby causing intra-peritoneal hæmorrhage. I am convinced that, if the patient is partially anæsthetised and the exploration needle is sufficiently sharp and of correct calibre, little or no danger is to be apprehended. The patient should receive 1/100 gr. atropine about half an hour before the puncture is to be performed, and the skin over the costal margin should be infiltrated with 1 per cent. novocaine solution. The entry of the needle through the abdominal wall and the piercing of the peritoneum will thereby be rendered to a great extent painless, with the result that the patient will not flinch or suddenly retract the diaphragm, a movement which is liable to lacerate the splenic capsule. The needle employed should be of a bore sufficient to admit of a plug of splenic tissue, but should not be so stout as actually to lacerate the pulp. (Allen and Hanburys' No. 10 size I find to be the most suitable; this needle is also of the correct length—40 mm.)

Considerable difficulty may be experienced in obtaining microscopic preparations free from aspirated blood comprising mostly pulp cells containing the Leishman-Donovan body. For this purpose the plunger of the aspirating syringe should not be driven home to the extremity of the barrel, but an air space of 1 cm. at least should intervene. Traction on the piston must be steadily kept up directly the needle is ascertained to have entered the organ, and aspiration must cease directly blood can be seen entering the barrel of the syringe.

On retraction of the syringe the aspirated tissue and blood is blown out on to a clean microscopic slide and examined in a darkened room by means of an electric pocket torch (the "Ever Ready" being the most suitable for the purpose). The light being held underneath the drop, the portions of spleen pulp can be easily demonstrated like small grains of sago floating in the blood-stained fluid. These particles of tissue are then picked out by means of a

fine platinum loop and spread upon clean slides. Preparations of splenic pulp cells are thereby obtained, in which the parasites can be demonstrated without difficulty by means of Leishman's stain.

In a splenic puncture recently undertaken the success of this measure was remarkable. The resulting films consisted of a mass of splenic endothelial cells, few red blood corpuscles being visible in the preparation.

Reviews and Notices of Books.

PATHOLOGY AND BACTERIOLOGY OF THE EYE.

Second edition. By E. TREACHER COLLINS, F.R.C.S., Consulting Surgeon to the Royal London Ophthalmic Hospital; and M. STEPHEN MAYOU, F.R.C.S., Surgeon to the Central London Ophthalmic Hospital. London: W. Heinemann. 1925. With 4 coloured plates and 306 figures. Pp. 731. 42*s*.

THE authors of this work have long been recognised as authorities on ocular pathology, and the present edition embodies chiefly the results of their own researches, excellently illustrated by figures, many of them reproduced from original papers in the Transactions of the Ophthalmological Society.

The first chapter on aberrations in development is divided into five sections in which the various abnormalities that are met with are traced to their respective periods of origin in embryological history. Incidentally, we find some interesting explanations of some not uncommon clinical appearances—e.g., the so-called shot-silk or watered-silk retina, pseudo-optic neuritis, and the congenital crescent that is sometimes found and which has nothing to do with myopia. On the subject of congenital colour-blindness the authors profess themselves on the side of those who attribute it to some, at present unascertained, aberration in the cones. Chapter II., on neoplasms, includes figures and descriptions of various uncommon forms of cysts. Chapter III., on disturbances in the circulation and constitution of the nutrient fluids of the eye, deals with arterial and venous obstructions, hæmorrhages, and serous effusions. It also explains the mechanism of normal intra-ocular tension, and deals with the problems connected both with glaucoma and with diminished intra-ocular tension or hypotony, to which subject Mr. Collins has given special attention. In Chapter IV., on injuries, special interest attaches to the explanation of the condition known as "commotio retinæ," following a contusion of the eyeball without rupture of its coats. The drawing of a microscopical section shows a subchoroidal hæmorrhage compressing the capillary layer of the choroid. If the blood is absorbed soon circulation in the choroidal vessels is re-established and the retinal functions are regained; if, on the other hand, it is long in being absorbed, the rods and cones atrophy, the pigment cells become visible, and sight is permanently impaired. Chapter V., which has been largely rewritten, deals with inflammation—in the first place the changes common to all inflammatory processes, and in the second the modification of the general processes of inflammation in the various structures of the eye. Chapter VI. deals with parasitic diseases affecting the eye, bacteria, fungi, and animal parasites, *Spirochæta pallida* being classed under the third heading. Under a fourth—diseases which are probably but not certainly due to micro-organisms—are included trachoma, vernal catarrh, and sympathetic ophthalmitis. In Chapter VII., dealing with degenerations, various forms of cataract are dealt with, and under the heading of neural epiblastic degenerations is included retinitis pigmentosa, in accordance with the theory held by Mr. Collins that it is actually caused by an abiotrophy of the retinal cells. An appendix on laboratory methods completes the book.

This work does not pretend to be encyclopædic or final. There is, for instance, no reference to those concussion injuries to the eye caused by bullet wounds of the orbit described by Lagrange, and the authors have not attempted to include all the findings of slit-lamp microscopy of the living eye, a study which is as yet in its infancy. Within its self-imposed limitations, however, the work is a thoroughly sound one, and we recommend all ophthalmic specialists to become familiar with it.

CHEMISTRY IN THE SERVICE OF MAN.

Third edition. By ALEXANDER FINDLAY, M.A., D.Sc., F.I.C., Professor of Chemistry, University of Aberdeen. London: Longmans, Green and Co. 1925. Pp. 309. 6*s*.

Prof. Findlay belongs to that small group of scientists who are able to write for both the advanced student and the lay reader. The work has been enlarged and three new chapters have been added. The first of these deals with radio-activity. Here the author traces the growth of the present-day theories with regard to the constitution of matter. Dalton, in 1803, taught that the atoms were solid, undividable bodies, but even so early as 1816 Prout was led to suggest that the atoms of different elements were all built up of some primordial substance which he called protyl. Prout put forward this theory on account of the atomic weights of the elements being, in most cases, whole numbers. This theory did not receive much support until Mendeléeff described the periodic law. The next line of approach came through the study of electrical discharges in vacuo, and from these two sources the present ideas of the structure of the atom is evolved. Confirmatory evidence was obtained by studying the properties of radium. The second new chapter is on the rare gases of the atmosphere. Here are described the experiments leading to the isolation and identification of argon, krypton, and allied gases. The third addition deals with metals and their alloys. Here the author considers the methods available for the preparation of these bodies from their ores, and their properties and alloys. Prof. Findlay describes the interesting condition known as "tin plague." He points out that under 18° C. ordinary lustrous tin is unstable and changes into a semi-porous state known as grey tin. If the temperature is very low these changes can take place fairly rapidly, resulting in marked disfigurement of any article made of the metal. A plate is included showing a seventeenth century medal suffering from "tin plague," which completely spoils the otherwise dignified appearance of one Balthasar-Bekker.

In the main, the rest of the work has been left unaltered. Certain sections have been revised and some rewritten. The style and choice of subjects are admirable, and Prof. Findlay is to be congratulated upon the appearance of this third edition of a charming book.

ELEMENTS OF COLLOIDAL CHEMISTRY.

By HERBERT FREUNDLICH, Fellow of the Kaiser Wilhelm Institute of Physical Chemistry. Translated by GEORGE BARGER, F.R.S., Professor of Medical Chemistry in the University of Edinburgh. London: Methuen and Co., Ltd. 1924. Pp. 210. 7*s*. 6*d*.

Prof. Freundlich's work upon adsorption and other colloidal problems is well known. It is mainly for his work on the mathematical aspect of adsorption that he is famous. Freundlich's adsorption equation has become an accepted scientific fact. It will therefore come as a cheering surprise to the general reader that not a single mathematical deduction is included in this little book. The main body of the work consists of a condensed form of the author's larger book, "Kapillarchemie," which has become a standard work on colloids. The volume is divided into two main sections, the first of which sets out the physico-chemical foundations of colloidal chemistry. After an interesting introduction the author deals with capillary chemistry—i.e., the changes occurring at interfaces. This method of attacking the problem

of colloids is essentially Teutonic, and this volume is certainly one of the first to be published in the English language in which colloidal chemistry is presented in the form of capillary chemistry. The author considers the events taking place at the interface between liquids and gases, two liquids, a solid and a gas, and finally between a solid and a liquid. By this means the whole of the field is covered, and the first section concludes with two articles on capillary-electrical phenomena, and the problems of interfacial layers. In the second section the author deals with colloidal systems as a whole. Thus the properties of sols, gels, mists, and smokes, and the like are considered.

There are perhaps one or two points which might be criticised. Little or no reference is made to the work of J. Loeb on adsorption in relation to the iso-electric point of proteins. In the second place, it is possible that the author has been too drastic in eliminating all mathematical considerations. A simple mathematical treatment of adsorption would certainly have assisted some students in grappling with larger works.

In the translator's note Prof. Barger says: "I was so impressed by the manuscript of Prof. Freundlich's 'Grundzüge der Kolloidlehre,' that I at once undertook its translation." We have to compliment Prof. Barger, firstly, upon his judgment, and, secondly, upon his ability as a translator.

THE BACTERIOLOGY OF FOOD.

By CUTHBERT DUKES, M.D., M.Sc., D.P.H., Lecturer in Bacteriology, King's College for Women. London: H. K. Lewis and Co., Ltd. 1925. Pp. 180. 7*s.* 6*d.*

Dr. Dukes has produced a readable little book which contains much information not hitherto available in a collected form, although it may be found scattered through the pages of larger works. The volume is likely to be appreciated by the students for science degrees, for whom it is primarily written, and it may also be read with profit by both medical and D.P.H. students who are too often content with those aspects of bacteriology which are directly relevant to pathology. About a half of the book is devoted to milk and its products, and perhaps other foodstuffs suffer a little by contrast, but both water and alcoholic beverages receive adequate attention. We consider that the direct search for tubercle bacilli in milk is really a waste of time and energy, and that since Dr. Dukes evidently only teaches on the subject as a concession to ancient usage, he might omit the section. There is a mistake on p. 57 where the virulence test for *B. diphtheriæ* is described as being made by the injection of a "serum slope" into guinea-pigs. The correct practice is to use broth cultures.

AN INTRODUCTION TO SEXUAL PHYSIOLOGY.

By F. H. A. MARSHALL. London: Longmans, Green and Co. 1925. With 72 text figures (some coloured). Pp. 167. 7*s.* 6*d.*

THE conventional text-books of physiology generally contain a most inadequate account of the working of the sexual apparatus, and the average student would probably be pained and surprised if he was asked some very simple questions about it. The truth is that the answers to some of these simple questions—why do the breasts hypertrophy during pregnancy, what brings pregnancy to an end, what determines the sex of a child and so forth—have been and in some directions still are quite obscure, and their discussion has been hampered by a mingling of fact and fancy which is unknown in those departments of physiology of less urgent human interest. Since the publication of Dr. Marshall's "Physiology of Reproduction" (with a second edition in 1922) it has been easy to learn what is known on the subject and, which is perhaps more important, to appreciate what is not known and how many ordinary things need investigation. In this country he has made the topic his own, and he now increases our indebtedness to him by publishing a short and simple version which should have a wide circulation. It is intended "for biological medical and agricultural students," is well illustrated (thanks, we suppose, to the existence of the larger book) and cheap, and gives an admirable account of the sexual cycle, pregnancy, lactation, and the influence of the sex-glands, fecundity and the related problems; determination of sex is also discussed. The writing is clear and straightforward. The tangled sentence on p. 131, "the fact that the free-martin and its partner are not derived from the same egg is definitely negatived by there being two corpora lutea," is an exceptional muddle which a new edition will correct, and the difficult task of abbreviating a systematic book seems to have been done very well. We cordially commend the book for itself and as an introduction to the fuller account.

BRONCHIECTASIS.

Traitement Chirurgical de la Dilatation Bronchique. By Dr. P. GUIBAL. Paris: Masson et Cie. 1924. Pp. 173. Fr.10.

THE surgery of the lungs and bronchi has not received in France the attention it has long enjoyed in the U.S.A. and Germany. It is to make good this defect that Dr. Guibal has written this little book which deals with such operations as artificial pneumothorax, thoracoplasty, pneumotomy, ligature of the branches of the pulmonary artery, lobectomy, and partial pneumectomy, as far as they concern bronchiectasis. It is disappointing, but not surprising, to find how ineffective many of these procedures are for this disease. An artificial pneumothorax may rid the patient of all his sputum as long as the injections of gas are continued, but soon after the lung is allowed to re-expand the bronchiectatic state returns. Extrapleural thoracoplasty may be a good palliative remedy in cases of bronchiectasis which are mainly unilateral, but, according to the author, complete recovery can never be achieved in unilateral cases of diffuse bronchiectasis operated on according to Sauerbruch's technique. An interesting account is given of such daring operations as lobectomy, the mortality of which is from 40 to 50 per cent.—a high risk justified only by the desperate prognosis of many cases left in the hands of the physician. This book is a useful introduction to the subject and it does not claim to be more.

THE TEMPORAL BONE.

L'Os Temporal chez l'Homme Adulte: Iconographie et Description de l'Os et de ses Cavités. By PHILIPPE BELLOCQ. Paris: Masson et Cie. 1924. Pp. 128. Fr.18.

THIS monograph, written by Dr. Bellocq, on the results of his personal investigations of a large material, is an excellent example of the clearness in description which is so frequently a marked characteristic in French anatomical works. Like most of these, it is written from the surgical or pathological standpoint more than from that of the morphologist, and deals first with the bone as a whole, subsequently treating of the connexions of its constituent parts, the details of each of these parts, and the various cavities contained in the structure. The descriptions are excellent, clear and reliable, and are aided by good figures in line, so that—to the anatomist at any rate—there is no break in the continuity of interest and description. It may be, however, that the purely descriptive standpoint is not the best possible one for the non-anatomical reader when he begins to study the details of the temporal. The bone is the most complex portion of the skeleton, built up by the fusion of parts derived from distinct and separate planes and regions, and it would seem better to give such a reader a mental picture or conception of the bone made up in this way as a preliminary to his detailed study, and a guide to his comprehension of the medley of facts into which he is plunged. This view may be prejudiced, it might perhaps be held to be fallacious.

but it does not, at any rate, keep us from the expression of sincere admiration for this descriptive account of the bone; any clinician who has to do with the temporal bone, and feels that he would like to improve his acquaintance with it, can be advised to procure this book and some sectional bones, when he should have little difficulty in attaining his object.

INTELLECTUAL DEVELOPMENT AND THE ERECT POSTURE.

By WM. COLIN MACKENZIE, M.D., F.R.C.S., F.R.S.E., Director of the National Museum of Australian Zoology, &c. Melbourne: Allan Grant. 1924. Pp. 41.

THIS little book has been written in support of Dr. Mackenzie's belief that the assumption of the upright position is the most important factor in the evolution of the human species, that this is inherently a question of muscular development, and that the degenerations and diseases to which the unfortunate human being is prone are mostly to be credited to his failure to keep his muscular system going in the proper way. We have been disappointed with the book. Whether Dr. Mackenzie's creed will stand examination or not could hardly be determined by study of such a small work, but it cannot be said that he has carried out the intentions expressed in his opening pages. The mere account of certain differences in the comparative anatomy of living mammals does not in itself constitute an evolutionary argument. In many respects the little work is an interesting one to read, and in many ways suggestive.

PRACTICAL CHEMISTRY BY MICRO METHODS.

By EGERTON C. GREY, D.Sc., F.I.C., M.R.C.S., Professor of Chemistry, Government Medical School, Cairo. Cambridge: Heffer and Sons. 1925. Pp. 124. 4*s.* 6*d.*

THE author has written a text-book of analysis for medical students in which white tiles are substituted for test-tubes. Reactions are also performed on slides, and the results may be observed by means of a small microscope or by a pocket lens. It is thus possible to conduct a complete course of analysis with great economy. All teachers are aware of the liberality of medical and other elementary students with reagents. A whole set of reagent bottles may be emptied during the analysis of some simple solid. By means of the techniques outlined in this book it would be impossible for the student to waste his reagents. The idea of micro-analysis for elementary students is not a new one, since it has been employed extensively in technical schools and similar institutions in this country for some time. Teachers speak well of the method, and Prof. Grey's book should prove of great value to all engaged in teaching analysis to these students.

TUBERCULOSIS.

Les Processus Naturels de Guérison de la Tuberculose Pulmonaire. By Dr. JAQUEROD. Paris: Masson et Cie. 1924. Pp. 121.

A SOUND knowledge of the physiology and pathology of the lungs invaded by the tubercle bacillus is surely essential to any scientific attempt to cure pulmonary tuberculosis. It would not be necessary to repeat this platitude were it not for the ambitious tendency of human beings to try to run before they have learnt to walk, and to try to cure evils before their causes are known. Dr. Jaquerod's book is a painstaking protest against this tendency as it appears in the field of therapeutics, and throughout the pages of his book his main thesis is that we must penetrate into the secrets of cure by Nature if we expect, in common phrase, to "go one better than" Nature. With a background of 20 years of specialising in pulmonary tuberculosis, he teaches this among other lessons: Give Nature time. Translated into more definite terms, his opinion is that at least a year is required for the clinical recovery of a case of pulmonary tuberculosis. And, as life for the ordinary human being is "the maintenance of an equilibrium always threatened," it behoves the consumptive to regard his own particular equilibrium as very unstable. All of which is plain, but apt to be disregarded as too obvious to be constantly borne in mind.

Concealed Tuberculosis or "The Tired Sickness." A Clinical Study upon the Exhaustion Type of Hidden Tuberculous Infections. By GEORGE DOUGLAS HEAD, B.S., M.D. Philadelphia: P. Blakiston's Son and Co. Pp. 137. $2.00.

THE author of this book has made a discovery. It is that many persons who complain of symptoms commonly traced to neurasthenia are suffering from a tuberculous infection which is the cause of all their troubles. Now, this is a discovery which every intelligent physician makes, and one is inclined to ask: Why write a book about it? The gist of the author's thesis is summed up in two of his sentences. "This slow-burning fire of a low-grade tuberculous infection manifests itself in such an insidious manner as to escape detection by the usual clinical methods of diagnosis. . . . This type of tuberculosis fails of recognition unless the specific tuberculin tests are used." There follows a plea for the subcutaneous tuberculin test which the author has never known in his own practice to disseminate tubercle. Yet he has been using Koch's old tuberculin subcutaneously since 1895. Such immunity to tuberculin disasters is extraordinary.

DISORDERS OF THE VENOUS SYSTEM.

Entzündung, Thrombose, Embolie und Metastase im Lichte neuerer Forschung. Von Prof. Dr. PAUL VON BAUMGARTEN, in Dresden. München: J. F. Lehmanns. 1925. Ss. 208. 7*s.* 7*d.*

CONTAINING little in the way of original observations or new conceptions, this book is a compendium of most that has been thought or written on the subject. For such books there is a distinct place, but the usefulness of this particular one will, unfortunately, be somewhat limited for English readers by the author's peculiar style. It may appear presumptuous to criticise the literary construction of a foreign author, but Dr. Baumgarten's habit of including adjectival subclauses within each other surely passes the limits allowable even in the language in which he writes.

DISEASES OF THE EYE IN CHILDREN.

Die Augenerkrankungen des Kindesalters in ihrer Besonderheit. By Dr. L. HEINE, Professor and Director of the University Eye Clinic at Kiel. Berlin: S. Karger. 1925. With nine illustrations. Pp. 52. M.3.

THIS small volume is written for the benefit of those practitioners who, without being eye specialists, possess sufficient skill in the use of the ophthalmoscope to make its employment a routine measure in appropriate cases, and desire to be able to treat all ordinary cases of eye disease in children not requiring operation. Among the useful points that they will find here, and which they would not find in ordinary text-books of children's diseases, are that infants affected with blepharospasm at birth, when the cause has been removed and they can open their eyes, may appear to be completely blind for some weeks, especially in cases of malnutrition. The disease known as kerato-malacia, which is found in badly-nourished infants, is, we are told, extremely rare in Schleswig-Holstein, although in Hesse and Silesia it is not uncommon. With regard to optic atrophy and neuritis, the author tells us very truly that it is by no means easy to make a confident diagnosis in children from a single examination with the ophthalmoscope. In young children the disc may be very pale or grey without the presence of any degree of optic atrophy. On the other hand, cases of apparent or "pseudo-" neuritis are sometimes seen in children when the condition is purely physiological. The author cites a case in which he himself was inclined to diagnose a

true neuritis until he discovered the same anomaly in other children of the same family. Most ophthalmic surgeons have had more or less similar experiences. The subject of refraction is only lightly touched on, but what is said is, broadly speaking, sufficient for the practitioner who does not specialise on the eye. We miss any instruction as to special precautions to be taken in the case of myopic children and as to the advice to be given to parents. With this exception the little book is as complete as it can be made in the small space that the author allows himself.

APPLIED ANATOMY.

Sixth edition. By GWILYM G. DAVIS, M.D. Revised by GEORGE P. MÜLLER, M.D. London and Philadelphia: J. B. Lippincott Company. 1925. Pp. 638. 42*s*.

Davis's "Applied Anatomy" has been a well-known and well-studied text-book for many years. The untimely death of Prof. Davis has led to the production of this edition by the present Professor of Clinical Surgery in the University of Pennsylvania. There has been a considerable amount of new matter introduced, and operative descriptions have been brought up to date where required. The illustrations remain a great feature of the book, and some can be termed beautiful. It may be pointed out that the surgeon who, in Fig. 254, is manipulating the right arm of a supine subject, does not seem to be interested in the fact that this limb carries at its extremity a left hand.

The book is beautifully got up, and there is no doubt that it will continue to be a favourite work of reference.

ANTHROPOLOGY.

Measurements, Weights, and Other Facts Relating to Man. By J. F. TOCHER. Edinburgh: Oliver and Boyd. 1924. Pp. 172.

THIS volume of anthropological statistics from Scotland contains the second and third reports of the William Ramsay Henderson Trust. The first, published in 1905, was an anthropometric survey of the inmates of lunatic asylums in Scotland; the object of the Trust in preparing the present volume was to ascertain whether or not the asylum populations could be regarded as fair samples of the general population in this respect. Observations have therefore been made on the population of the north-eastern region of the country and on soldiers drawn from all parts of Scotland. The results obtained show that the insane populations represented the total population very adequately. The volume is essentially one for the specialist; it manifests the elaborate patience and care that all such surveys demand, and will take its place with the similar records that modern biometric schools are steadily producing against the day when there shall be sufficient accumulation to provide a basis for really valuable statistical deductions on a large scale.

Human Constitution. A Consideration of its Relationship to Disease. By GEORGE DRAPER, M.D., Associate in Medicine at Columbia University, New York. London and Philadelphia: W. B. Saunders Company. Illustrated. Pp. 345. 37*s*. 6*d*.

THIS volume is a collection of comprehensive anthropometrical statistics showing the relation between human morphology and disease. Dr. Draper has for some years been collecting data at the Constitution Clinic in the Presbyterian Hospital of New York and has enlisted the help of anthropological and anatomical specialists. He claims that his method is more accurate and more inclusive than those hitherto employed, and that all victims of certain diseases show pronounced morphological features in common. The diseases considered here are gastric and duodenal ulcer, gall-bladder disease, nephritis, hypertension, pernicious anæmia, tuberculosis, and asthma. There is a definite tendency at the present time for workers in all parts of the world to attempt to correlate bodily structure with pathological diatheses. The practical application of such data, if further research confirms the presence of a recognisable correlation, is not yet apparent, but it is easy to speculate on further advances in preventive medicine if it becomes possible to tell from biometric investigation of the school-child or youth what mental or physical aberrations he is likely to develop. This volume must await confirmatory evidence before its value can be appraised.

A Short Course of Physical Anthropology. By M. R. DRENNAN, M.B., F.R.C.S.E., Professor of Anatomy in the University of Cape Town. Cape Town: The S.A. Electric Printing Co., Ltd. 1924. Pp. 43. 5*s*.

THIS little book was written primarily for the students of anatomy of the University of Cape Town, to relieve them from the tedium of note-taking, and its scope "coincides with the limited syllabus which is at present prescribed for the anthropological part of the anatomy course and examination." Prof. Drennan deserves congratulations on the excellent little compilation he has made, wherein a great number of facts and views are given shortly but clearly. The volume can be recommended as a guide or note-book in any department in which a course in physical anthropology is taken, and its modest price puts it well within the reach of students.

ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.—The thirty-fifth meeting of the Commission was held in Edinburgh on June 30th, Prof. Alexander Gray in the chair. Evidence as to the provision of dental treatment for insured persons was given by the East of Scotland Dentists Panel, represented by Mr. Ernest Miller and Mr. William Arbuckle. Mr. William Thomson, secretary of the Scottish Coöperative Friendly Society, gave evidence as to the desirability of extending the scope of medical benefit and providing dental and other treatment benefits for insured persons, and also as to various matters in connexion with the administration of benefits by approved societies. Mr. John Reid, representing the chartered accountants of Scotland, gave evidence as to the audit of accounts of approved societies, and urged that this work should be entrusted to chartered accountants in general practice rather than to a special Government audit department. Mr. Matthew Reynard, clerk to the Association of Parish Councils of Scotland and clerk to the Glasgow Parish Council, gave evidence as to the relations between health insurance benefits and Poor-law relief. Mr. T. J. Addley, secretary of the Scottish Professional Assistants' Society, and Mr. R. Williamson, secretary of the Independent United Order of Scottish Mechanics, gave evidence on behalf of the Edinburgh, Leith and District Friendly Societies' Council.—The thirty-sixth meeting was held at the Home Office, Whitehall, on July 2nd, Lord Lawrence of Kingsgate in the chair. Evidence as to the work of the British Social Hygiene Council was given by Mr. E. B. Turner, Dr. Otto May, Dr. P. A. Clements, and Mr. Leonard Bowden. The Cambridgeshire Tuberculosis After-care Association, represented by Dr. P. C. Varrier-Jones and Mr. F. Bunnett, submitted evidence on the need for special benefit arrangements under the Insurance Scheme for persons suffering from tuberculosis. Similar evidence was given on behalf of the London County Council by Mr. G. H. Walmisley. The National Council of Agriculture, represented by Mr. James Donaldson and Mr. Denton Woodhead, gave evidence as to the undesirability of pooling the Insurance funds of societies. Thereafter the Society of Apothecaries, represented by Dr. A. D. Brenchley and Dr. Reginald Wall, and the Association of Certificated Dispensers, represented by Mr. Graham Bott and Mr. A. Wager, gave evidence as to the qualifications of the holders of the Society's certificate for Insurance dispensing. Volume I. of the Minutes of Evidence covering the period from Oct. 16th, 1924, to Jan. 8th, 1925 (the first to twelfth days inclusive), is now on sale at H.M. Stationery Office, price 10*s*. 6*d*. Part II. of the appendix to the minutes, containing the statements submitted by certain approved societies, insurance committees, dental societies, representative bodies, &c., on which the oral examination was based, is also on sale, price 10*s*. 6*d*.

THE LANCET.

LONDON: SATURDAY, JULY 11, 1925.

THE STATE OF PUBLIC HEALTH.[1]

THE annual Report for the year 1924 of the Chief Medical Officer to the Ministry of Health, Sir GEORGE NEWMAN, appears this week, being the sixty-seventh of a series presented annually by his predecessors and himself as medical advisers to the Privy Council, the Local Government Board, and the Ministry of Health respectively. The Report follows the precedents of the previous official records, and enables us to get an all-round view of the state of public health in this country, not only for the period covered by the details and statistics, but also in regard to a continuous policy and a progressive planning. The information and advice which it proffers alike to the Ministry and to the local public health authorities include the classified figures required year by year to estimate the state of public health, special references to particular diseases where the circumstances during the year has made them of interest, and notes of investigations undertaken with the object of obtaining fuller knowledge of prevalent scourges. The Intelligence Service of the Ministry now collects and disseminates information from home and foreign sources, and the medical information bureau thus constituted continues to increase in usefulness with the growing accumulation of tested, sifted, and collated experiences. In view of the frequently expressed opinion by semi-scientific speakers and writers that cancer research makes no progress, or that the mystery of cancer lies wholly in some dietetic faults, we recommend our readers to note the nature of the inquiries made already, or now progressing, under the Cancer Committee of the Ministry of Health.

The fundamental data of the physical life and health of the people in England and Wales during 1924 show, as for many previous years, a declining birth-rate, and while this is not balanced by a declining death-rate it is compensated for by the infantile mortality-rate. The death-rate of infants under one year of age per 1000 born during 1924 was 75, a figure which is translated for us in the Report as signifying that during the year in question the country saved 39,000 babies' lives over and above the average annual saving recorded during the decade 1901–1910. The great movement typified by the promoters of Baby Week, the activities of which are noted elsewhere in this issue, is bearing very definite fruit, and the fact that the figures of 1924 do not compare favourably with those of 1923 is an incident accounted for by the attacks of measles. The influence of epidemic infections on the population during 1924 present the special feature that among the mortality-rates there are found exceptional declines under the heading of small-pox, scarlet fever, and enteric fever. But the returns of the notifiable infectious diseases show marked increase of the epidemic disorders of the nervous system, encephalitis lethargica being particularly to blame. Pneumonia also was more prevalent than at any time during the last five years, and many more cases of small-pox occurred, though the mortality-rate was low, as it was in the case of enteric fever. Of these two epidemic inflictions, Sir GEORGE NEWMAN says frankly that, as they are controllable directly or indirectly, "their occurrence in epidemic form is almost culpable." In the year 1924, 3850 cases of small-pox were notified in England and Wales under the Infectious Diseases Notification Acts, and 32 other cases were reported, most of them coming to notice when local outbreaks of the disease were under investigation. Of the notified cases, only 85 were subsequently withdrawn on a revision of diagnosis, showing that with prevalence of the condition ability to detect it becomes much wider spread. Eight of the cases in this large total were fatal, though in Derbyshire alone 1351 cases were notified, and there were 650 cases in Yorkshire, and over 500 and 400 in Nottinghamshire and Northumberland respectively. In the County of London only four cases of small-pox occurred throughout the year, notwithstanding the very large number of persons from all parts of the country who visited the metropolis to attend the British Empire Exhibition at Wembley. Indeed it is one of the most striking features of the disease that London should remain so immune. In connexion with the mildness of the type of small-pox that has been prevalent recently we obtain from Sir GEORGE NEWMAN a clear pronouncement on the policy of making no difference in nomenclature and procedure under the Infectious Diseases Notification Acts as between small-pox and "mild small-pox." He enunciates, as a sound principle, that any specific disease should be notified as that disease, whether the attack be severe or mild.

There is valuable advice to the public in one of the final conclusions of the Report, its gist being that the public should be urged to use existing facilities devised by the Ministry of Health and provided by the medical profession for the maintenance of proper standards of health. Opportunities should never be missed to put before the public the pressing need that exists for the coöperation of public action in the promotion of preventive medicine. The columns of the more influential lay papers give this message day by day to enormous constituencies, but that vast progress which might be secured by the employment of medical knowledge and facilities now available is not made sufficiently prominent, and the education of public opinion is not sufficiently orderly. All the figures for the last half century go to prove the success which has attended scientific intervention in overcoming insanitation. This is so far public information that no one is found to-day who would suggest that the money spent in providing a good water-supply or in protecting child-life is other than well spent; and yet in many directions similar opportunities for overcoming disease are neglected. The public does not as yet choose to exercise to the full powers for the prevention of disease which are provided, and criticism of these or scepticism as to their efficacy is not well dealt with. The reasoned arguments of medicine will always be regarded by a certain school of thinkers as the outcome of professional selfishness—that odium we can bear quite lightly; but the reasoned arguments of laymen who speak with justified authority are not sufficiently credited as outweighing inchoate, uninformed or sentimental views—that is a national loss.

[1] Annual Report of the Chief Medical Officer to the Ministry of Health for the Year 1924. H.M. Stationery Office. 1925. 3*s*. 6*d*. net.

X RAY DOSAGE.

THE extensive use of X rays in the treatment of disease has brought about the necessity of measuring the dose administered in terms of a definite unit. A great amount of valuable work has been done at different institutions all over the world in the application of X rays to medicine, but hitherto, on account of the absence of a unit of measurement, it has been impossible to correlate the results and progress has greatly suffered in consequence. Undoubtedly the most urgent need of the radiologist at the present moment is a means of accurately measuring dosage. The first step towards this is the establishment of an X ray unit in terms of which he can compare the results of other investigators with his own. This was emphasised during an interesting discussion on International Units and Standards for X Ray Work, which took place at the International Congress of Radiology held last week at the Central Hall, Westminster—and reported in another part of this issue—when representatives from all parts of the world were present. The subject was considered from the physical as well as the biological aspect. The discussion was opened by Sir WILLIAM BRAGG, F.R.S., chairman of the British X Ray Unit Committee, who dealt with the physical nature of the problem, and he was followed by Dr. BÉCLÈRE, of Paris, who spoke from the standpoint of the radiologist.

Up to the present several units have been employed and confusion is likely to arise if the number of these units is allowed to increase. Already in this connexion the same letter "R" denotes two totally different quantities. Consequently the first step towards the settlement of the problem is to decide upon a definition of the unit which should be universally employed in all countries as a basis for the measurement of dosage. The unit which has found most favour is the electrostatic unit suggested as early as 1908 by the French physicist VILLARD. This unit may be expressed as the quantity of X ray energy which produces an amount of electricity equivalent to one electrostatic unit in passing through one cubic centimetre of air at 18° C. and 760 mm. Hg. Certain factors have to be considered when making this measurement, the chief of these being that all the energy dissipated in the volume of air considered is actually taken into account and that no extraneous effects interfere with the measurement. An absolute unit of this nature has an advantage over other units that have been suggested, in that the dose is independent of the apparatus employed for its measurement. Uniformity of measurement is therefore obtained apart from any particular experimental arrangement. Having fixed upon the unit, the next step is to calibrate in terms of this unit the different instruments employed for measuring dosage. In Germany the above unit has been employed for some time and instruments intended for medical practice have been calibrated at a number of centres situated in different parts of the country. The representatives reported that this scheme had proved quite satisfactory, an X ray dose being reproducible at any time in the various clinics. There are, however, certain precautions to be taken; for instance, it is essential to specify the quality of the radiation, as differences are observed when radiations of different penetrating powers are employed. In practice it has been found necessary to calibrate the instruments for a limited number of radiations of different quality. The establishment of the physical unit and the calibration of the dosimeters fall within the province of the physicist, and they can be carried out to a greater degree of accuracy than is required for practical purposes. Moderate accuracy will suffice, as the measurement of the dose under practical conditions cannot be made with a high degree of precision. The correlation of the indications of the dosimeter and the biological effect is the work of the radiologist. This presents some difficulty because only a fraction of the energy absorbed by the tissue will be biologically active. A good deal of research will have to be done on the biological side to determine this fraction. It is well known that the X rays which are scattered by tissue play an important part in the irradiation of deep-seated cancer. The intensity at a depth shows considerable variation according to the disposition of the apparatus and patient and the experimental conditions at the time of treatment. To obtain any degree of precision, the conditions of irradiation must be carefully stated. For instance, the size of the field irradiated, the voltage of the X ray tube, the distance from and the nature of the target. All these factors—and there may be others—should be noted when measuring dosage. Prof. WINTZ, of Erlangen, emphasised the importance of standardising these conditions so that results may be directly comparable.

To arrive at a complete solution of the problem the radiologist and the physicist must work in close coöperation. Already in this country and in Germany there exist X ray unit committees which have done valuable work in connexion with this all-important question of dosage. It is worthy of note that both these committees arrived quite independently at the same conclusion regarding the adoption of the electrostatic unit. It is likely that several methods will be employed to measure the unit, so that it will be necessary to check the calibration of an instrument in one country against that in another country. It is urged that an X ray unit committee be formed in each country and that these committees should keep in close touch with each other. It was resolved at the close of the discussion at the Congress that an international committee be formed to discuss the matter further, with a view to arriving at a scheme which will be universally adopted. Such an international committee, which will consist of both physicists and radiologists, will perform an important function and, as the result of its deliberations, it is hoped that research on the effect of radiation on human tissue will be greatly facilitated.

THE TASTE FACTOR IN DRINKING WATER.

THE British Waterworks Association held its annual meeting in London last week and discussed various aspects of the water-supply. Sir ALEXANDER HOUSTON, Director of Water Examination to the Metropolitan Water Board, submitted a paper on the Purification of London's Water-Supply. The greater part of his communication was devoted to the problem of taste, since it is insufficient to produce a water bacteriologically safe; consumers expect also to be supplied with a water free from objectionable taste. There are two kinds of taste liable to occur in town waters, chlorinous and iodoform. The former can always be avoided by correct dosage or by de-chlorination, the latter is unaffected by such de-chlorinating agents as sulphurous acid and sulphites. It has been known for a long time that phenol in extremely minute doses reacts with chlorine in water to produce this extremely unpleasant iodoform taste. ADAMS[1] has recently shown

[1] THE LANCET, May 23rd, 1925, p. 1093.

that 1 part of phenol in 1000 million parts of water is sufficient to produce taste and that there are sufficient phenol impurities in the atmosphere of towns to supply this proportion. Water authorities using chlorination must therefore protect their water from atmospheric air as well as from fog, mist, rain, and any liquid pollution liable to contain any trace of phenol. In spite of all prophylactic measures, taste troubles may still occur and must be combated. RACE, RIDEAL, HAROLD, ADAMS, HOUSTON, and others have devoted much study to this important question. The three chief substances that act as preventers of taste in water are organic matter, potassium permanganate, and ammonium compounds.

In the United States and Canada chlorination is nearly always practised after filtration, and it is possible that taste troubles would be avoided by using the chlorine before filtration. Slightly larger doses are required, but the extra expense is almost negligible. During the last eight years 70–80 million gallons of Thames water have been chlorinated daily before filtration, and no complaint of taste has been received from the two million consumers. Potassium permanganate was first used by HOUSTON in 1913 to remove a taste due to *Tabellaria*, and later, with equal success, in connexion with the New River chlorination treatment. The usual dose is 1 in 5 millions, and with waters of surface origin the pink tinge disappears within a few minutes. Unfortunately, however, it persists even with a smaller dose in the case of deep well waters containing hardly any oxidisable matter, thus rendering such treatment practically inadmissible. Permanganate has the advantage that it may be added before, with, or after the chlorine with equally good results. Laboratory experiments seem to show, however, that it cannot be used before filtration if chlorination is to be practised after. Whether or not this is due to the reabsorption of phenol bodies during the filtration process is not known. Ammonia and ammonium compounds are now being used in many places as taste preventers; apparently the first worker to use ammonia on a practical scale was RACE. The absence of colour is a great consideration, and although the cost, weight for weight, is higher than permanganate, it may be found on further study that the actual cost is less, since a smaller quantity is required and also it reduces the dose of chlorine necessary for sterilisation purposes. It seems as if ammonia, although it exercises a "lagging" effect, ultimately increases the sterilising action of chlorine. The dose of ammonia, expressed as nitrogen, required to prevent taste troubles varies in different cases, but 1 in 5 millions is an average figure. Sir ALEXANDER HOUSTON spoke of an experiment on a large scale, 45 million gallons a day, in which chlorine alone was first used in a dose of 1 in 3 millions. The percentage number of 10 c.cm. positive *B. coli* cultures was 26. When ammonia was added (1 in 5 millions) before the same dose of chlorine, the number of positives was reduced to 4.

The cost per pound of liquid chlorine, liquid sulphurous acid, permanganate, liquid ammonia, and ammonia compounds (expressed as nitrogen) is approximately as follows:—

	Pence.	
Chlorine	2·34	
Sulphurous acid	7·5	
Potassium permanganate	7·0	
Liquid ammon. (liquor ammon. fort.)	11·0	in terms of nitrogen.
Ammonium chloride	11·1	
Ammonium sulphate	9·2	

Thus chlorine is by far the cheapest chemical, and ammonia and its compounds the most expensive. At the same time, if very small doses of ammonia were found to be equally efficient as taste preventers, the balance might be economically in favour of ammonia. It is clear that great progress has been, and is being, made in our knowledge of the reasons why certain waters develop an iodoform taste in the presence of active chlorine, and the best and most economical ways of overcoming these difficulties. One gratifying health feature arises from these considerations. If taste troubles can be economically and certainly overcome, there will be less disposition to cut down the dose, with consequent risk of imperfect sterilisation, in order to avoid complaints from consumers as regards taste. There have been cases where the question of taste rather than of bacteriological result was the dominant factor in determining the dose of chlorine.

CONVENTION OF ENGLISH-SPEAKING OPHTHALMOLOGICAL SOCIETIES.

THE convention of ophthalmologists to be held next week in London is to be confined to English-speaking societies, but one of the subjects to be considered at a general meeting is the re-establishment of international ophthalmological gatherings on the pre-war basis. Science knows no frontiers, and it is to be hoped that the promoters of this discussion will be successful in their object. Meantime there is plenty of matter to engage the attention of the convention which is to be opened by a reception at the Royal College of Surgeons on the evening of July 13th. On the 14th, after the formal reception of delegates from the United States, Canada, and Australia, the President, Mr. E. Treacher Collins, will give the opening address on the Elimination of Eye Disease. This will be followed by the reading of papers by various members and in the afternoon by excursions to institutions of ophthalmic interest in London and its vicinity. In the evening a reception will be held at the Royal Institution of Great Britain, at which Sir William Bragg will give an address on Thomas Young and his Work. On the three succeeding days the programme is somewhat similar. Papers will be read during the day. A symposium will be held on the Evolution of Binocular Vision, in which Sir Charles Sherrington, Sir Arthur Keith, Sir Frederick Mott, Prof. G. Elliot Smith, and Prof. S. E. Whitnall will take part; Sir John Parsons will deliver the Bowman Lecture on the Foundations of Vision, and there will be a discussion on the Microscopy of the Living Eye. Sir William and Lady Lister's garden party and a reception at the Wellcome Historical Medical Museum will provide further opportunities for social intercourse, and the proceedings are to be wound up by a banquet at the Guildhall on July 17th, at which H.R.H. the Duke of Connaught is to be the guest of the convention. The organisers are to be congratulated on a programme so full of interest and variety. The meetings are to be held at University College, Gower-street, W.C. 1. On arrival in London every member of the convention is requested to attend as soon as possible at the Registration Bureau.

BETHLEM HOSPITAL SITE.—The Select Committee of the House of Lords which has had before it the Bethlem Hospital Bill authorising the removal of the asylum to the Monks' Orchard Estate on the Kent and Surrey borders, has decided that the measure ought to proceed on the ground that there is general agreement as to the desirability of the scheme. Sir Lynden Macassey, K.C., opposed on behalf of the Southwark Borough Council, which desires to keep the site as an open space, but Mr. Thomas, K.C., for the promoters, pointed out that the charity would suffer if the value of the site could not be realised. The governors, were, however, quite prepared to consult with the London County Council and to coöperate with the public authorities.

Annotations.

"Ne quid nimis."

MUSEUM OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

MEDICAL men who visit the Museum of the Royal College of Surgeons, Lincoln's Inn-fields, will meet with evidence of great activity. During the present month a special exhibition is being given in Room I. of the Museum of all the preparations and donations added to the collection during the past 12 months. At the end of the present month the additions are assigned to their permanent places in the Museum. Of the additions just made, over 300 in number, 170 represent pathological conditions, many of which were obtained by surgeons in the course of operations. Noteworthy are the preparations added to the series which illustrates disorders of the pancreas, for which the College is indebted to Mr. J. A. Cairns Forsyth, and those which exemplify tumours of the testicle, added by Mr. H. R. Dew. Particularly numerous are the preparations which illustrate diseases of bones and disorders of their growth. Visitors have an opportunity of examining the specimens which were prepared by the late Sir William Macewen during his classical researches into bone growth. Specimens presented by Mr. Alan H. Todd show an early stage in the onset of osteogenesis imperfecta. Dr. A. E. Pinniger adds to the collection a heart ruptured by indirect violence. A negro miner, who was within the radius of an accidental explosion, was picked up dead but with no external mark of injury. At the post-mortem examination a rupture was found of the left ventricle. Another remarkable heart was given by Dr. Robert Ellis, of Taunton. It is that of a boy who died from rupture of the ascending aorta, which was the site of an aneurysmal dilatation. Beyond the dilatation was a pronounced stenosis of the aorta of congenital origin. A specimen of identical nature was presented four years ago by Dr. G. A. Sutherland. Another interesting addition is that made by Mr. Arthur H. Crook, of Eastbourne. The preparation represents the viscera of a seventh month child which lived for seven days; it shows a malformation of the lower part of the œsophagus with complete stenosis of the middle part of the duodenum. A gift by Mr. Philip J. Franklin exemplifies a very uncommon malformation—a congenital union of the vocal cords of a child aged 2 years. Lieut.-Colonel R. H. Elliot has added very valuable sections of the eye to illustrate the pathology of glaucoma and of myopia. The same donor has also enriched the series which illustrates the craniology of anthropoid apes, by presenting skulls of the peculiar form of gorilla which inhabits the Kivu forests of East Africa. Through Dr. J. B. Christopherson the College has added to this exhibition specimens prepared by Dr. Fuzinami, of Kyoto, to illustrate experimental schistosomiasis.

The President of the College, Sir John Bland-Sutton, has made donations to all sections of the exhibition now on view. Particularly interesting is a series of models, carved in wood by the curator of the museum of the Historical Society, New Bedford, Mass., to show the external form of the larger kinds of whales. The value of this series is enhanced by an evolutionary tree of the whale family which has been mounted in the same case as the models.

Besides examining the special exhibition, which represents specimens which will be allotted to all departments of the Museum, visitors will have an opportunity of examining other additions and improvements which have been recently made in the Museum of the College. A special case designed by Mr. E. C. Frere, F.R.I.B.A., has been installed in Room I. to contain the surgical instruments and personal mementoes of Lord Lister. The Army Medical Collection is now exhibited in a spacious new room and is available for purposes of study. A special series is being brought together in Room III. to exemplify the various forms of disorder of growth to which the human body is subject. Sir Frank Colyer has set out a remarkable series of specimens to show how repair is carried out in the tusks of elephants after fracture and gunshot injury. Those interested in the portraiture of John Hunter may examine an extremely interesting portrait which, in the opinion of Sir Arthur Keith, is that of the celebrated surgeon, representing him when about his forty-fifth year. This portrait has recently been presented to the College by Mr. G. Buckston Browne. The Museum is open to all medical men and may be visited between 10 A.M. and 5 P.M., except Saturday afternoons, when it is reserved for ambulance and other classes.

THE CHALMERS MEMORIAL GOLD MEDAL.

THIS medal is awarded biennially to persons under 45 years of age for "researches of outstanding merit contributing to our knowledge of tropical medicine and hygiene." At the recent annual general meeting of the Royal Society of Tropical Medicine and Hygiene it was presented by the newly elected President, Dr. Andrew Balfour, C.B., C.M.G., to Prof. Warrington Yorke, of the Liverpool School of Tropical Medicine, in recognition of his work on trypanosomiasis, malaria, and many other subjects. Prof. Yorke read a paper on Further Observations on Malaria Made During Treatment of General Paralysis. The earlier work of Prof. Yorke and Dr. J. W. Scott Macfie on this subject was communicated a year ago and showed that induced malaria, whether as a result of direct inoculation of the blood of an infected patient or the bites of infected mosquitoes, was remarkably susceptible to the action of quinine in a dosage of 30 gr. on three consecutive days. It was further discovered that quinine has no true prophylactic action, for daily doses of 10 gr. of quinine administered for five days before, on the day of and for seven days after the infecting bite of the mosquito, did not prevent the onset of typical malaria. Similarly, 30 gr. given on the day of the bite and on each of the two succeeding days did not prevent malaria. From these results it was evident that quinine, though very efficacious for the primary attack of malaria when parasites appeared in the blood, had no action on the sporozoites injected by the mosquitoes.

Prof. Yorke's paper at this meeting dealt with the subsequent history of the cases reported on last year. The number of relapses has remained at 2 per cent. in more than 100 cases of malaria induced by inoculation of virulent blood and treated by the three-day course of quinine, from one and a half to two and a half years ago. The inoculation of the strain from man to man during three years, involving more than 40 passages, has not produced an increase in virulence or any morphological variation in the parasite itself. Where the infection had been induced by the bites of mosquitoes, with a similar course of treatment, 21 out of 37 patients relapsed, two in the first month, two in the second, one in the third, and the rest from the fourth to the eleventh months. The late development of these relapses is in marked contrast to the experience of the war, when the vast majority of relapses occurred within six weeks of cessation of treatment. Of the 21 relapses, fever disappeared in the majority of cases either spontaneously or as a result of a second short course of quinine. These results are very different from those obtained during the war, and it does not appear that the amount of quinine or the manner of its administration, the period of the year when an infection or treatment occurs, or the strain of parasite can explain this outstanding difference; the only factor which can reasonably account for it is the individuality of the patient. This factor appears to be the one which determines whether a relapse will occur and, if so, when. On the subject of the mechanism of the action of quinine, Prof. Yorke

could see no reason to alter the opinions expressed in the communication made last year. Quinine destroys large numbers of the malarial parasites, the broken-down bodies of which act as an antigen to stimulate the production of antibodies which, if present in sufficient amount, bring about a sterilisation of the infection and the cure of the patient. Some evidence has been obtained that the drug acts indirectly in destroying parasites, certain body cells coöperating with the quinine in producing a substance directly toxic to the parasites. The use of large doses and prolonged courses of quinine is not advocated; the best method of treating malaria is to deal with the attack with a few moderate-sized doses and await developments; if relapses occur, repeat the treatment and maintain the general health by diet and avoidance of exhaustion, for relapse depends on the reaction of the patient himself and his capacity to develop immune body.

ANTHROPOLOGY AND PREVENTIVE MEDICINE.

THE fact that certain persons are more liable than others to contract or to succumb to certain diseases must have been known from the earliest days of observation, but the science of immunology is of recent birth and has not yet found an answer to the fundamental question as to why A is happy in immunity while B is not. The facts and experiments concerning racial and species immunity at present recorded form a tangled skein of unrelated and unexplained threads for the unravelling of which the help of the anthropologists is needed. For this reason Lieut.-Colonel J. Cunningham, I.M.S., himself the son of a distinguished anthropologist, chose as the subject of his paper before a recent meeting of the Royal Anthropological Institute "Some Factors in Racial Immunity." India is peculiarly suited for a study of the problems of race immunity since peoples of totally different genealogy, diet, habits, and sanitary standards are there encountered living side by side under identical environmental conditions. Among the observations on record are those of Dr. Agnes Scott on osteomalacia, the incidence of which she found to correspond with the *purdah* system or, in more general terms, with any area where the women live sedentary, secluded, and unhygienic lives. Colonel Cunningham himself has noted the limitation of kala-azar epidemics in Kayalpatnam, S. India, to the Mohammedan community. These, being traders, came in contact with infected towns, but never communicated the disease to the segregated Hindu agriculturists living in the same village. He has also investigated the relation between climatic conditions and dysentery in certain gaols of Southern India. The largest peak in the chart of dysentery incidence was found to correspond with the summer rains, while two lesser peaks indicated relapses occurring at the onset of the hot and cold weather respectively. In fact, the cases of acute attack could be correlated with the sudden changes of temperature accompanying thunderstorms. An example of species immunity is seen in the reaction of rodents to anthrax, the rat being almost immune, the guinea-pig and mouse extremely susceptible, while the rabbit is less so. The racial variation in susceptibility to tuberculosis is strikingly seen in the incidence of the disease in the French Army of occupation, the figures per 1000 being: French 9·5, Moroccans 11·7, Arabs 13·3, Annamites 15·3, and Senegalese 86·1. Modern tests, such as the Calmette and von Pirquet reactions, the Schick test for diphtheria, and the Dick test for scarlet fever, provide an accurate method for estimating natural immunity. On Thursday Island 96·8 per cent. of the population were found to be susceptible to diphtheria. Rose Carter has shown that the supposed immunity of the negro to yellow fever is really a case of susceptibility to toxin rather than to micro-organism, so that the death-rate is definitely less among negroes than among white men, although it is doubtful whether the incidence differs greatly.

It has been stated that the European in India is much more liable to intestinal disorders than the native, but 25 per cent. of the natives are infected with dysentery and the apparently greater liability of the white man may be accounted for by his unwitting contact with infected servants. The original claim that native races showed a relative immunity to cancer has been modified in recent years, and the latest statistics tend to show that it is only the particular variety of malignant growth that varies from race to race. The Chinese are especially liable to carcinoma of the stomach and to an epithelioma of the hip, due to sleeping on the hot *k'ang*, and Eastern races generally suffer from a primary carcinoma of the liver that takes the place of Western intestinal cancer. The Javanese show a high percentage of malignancy of liver and uterus. The importance of the factor of exposure to infection, personally or racially, has not yet been adequately assessed. Negro races that have only recently come into contact with civilisation manifest a very high tuberculosis mortality with low morbidity, while those that have been long associated with the white man show figures similar to Western statistics. In Colonel Cunningham's opinion there is no evidence of true racial immunity in man, comparable to that seen in animals, but the coöperation of anthropologists and immunologists is required in the further investigation and interpretation of the facts obtainable.

ICE-CREAM AND SCARLET FEVER.

Dr. A. Mearns Fraser has reported to the Portsmouth Health and Housing Committee on an outbreak of scarlet fever arising from infected ice-cream. Up to the last week in May there was no undue prevalence of scarlet fever in Portsmouth, but on May 29th 21 notifications were received, on May 30th 21, on May 31st 14, on June 1st 8, on June 2nd 6, on June 3rd 1, and on June 4th none. Altogether there were 83 notifications in five days. It was soon noted that the common feature was the consumption a day or two previous to the attack of ice-cream made by a firm of dairymen and sold at various branch shops. On May 30th a medical practitioner notified eight patients who had attended a whist drive and were at first thought to be suffering from food poisoning. They had partaken of ice-cream at the whist drive. Three assistants at the branch dairy shops were among those notified. Ultimately it was found that all the ice-cream was made by a man and a boy at one of the branch shops. The boy went home ill on the night of May 29th and was diagnosed as scarlet fever on May 30th. It was stated that the boy had a sore-throat, which he did not mention, for a week before going off work. Apparently the rash was not noticed until the night of May 29th. There were no cases of scarlet fever among the customers who only consumed milk supplied by the dairy, and after full consideration of the facts Dr. Fraser concludes that the ice-cream was infected by the boy and that none of the other three employees at the other branches was in any way implicated. The dairy firm gave every assistance in the investigation and were quite unaware of the fact that the boy was indisposed during the week previous to his definite attack. The outbreak fortunately was of a mild type. A feature, which has been observed before in the case of milk outbreaks, was the shortness of the incubation period in many of the cases. Another noteworthy feature was the early stage of the illness at which the boy was able to infect the milk. Again, it has been common to a number of other milk epidemics that the symptoms of the apparent infector have frequently been obscure. Dr. Fraser is not aware that scarlet fever outbreaks have ever been traced to ice-cream before, although enteric fever outbreaks from this source are on record. A noteworthy example of the latter occurred a few years ago in the South Shields rural district. The ice-cream in the Portsmouth case was made of cream custard and eggs in an

electrically worked freezing machine. The boy's job was to pack the ice-cream into tins for distribution and then take it round to the various branch shops. The outbreak ceased abruptly on the stoppage of the sale of the ice-cream. It is difficult to see how such outbreaks can be entirely prevented. The present one cannot be attributed to negligence, and a daily medical examination of all persons employed in handling milk is hardly feasible.

TREATMENT AT MENTAL HOSPITALS.

RECENT reports of mental hospitals, of which some abstracts appear on another page, show the trend of modern mental treatment in public institutions. There is a steady movement towards treatment as opposed to bare maintenance. Committees and medical officers are realising that the difficulty of restoring the mens sana offers no reason for neglecting to furnish a corpus sanum. Dietaries are everywhere being overhauled to see where they can be improved and their caloric and vitamin content made adequate. Butter is taking the place of margarine and nourishing and palatable items are being added to the menus. Specialist services are being enlisted to remove any source of bodily disability or focus of sepsis, and nearly all mental hospitals now have a dental surgeon attached to the regular staff. The absence of a pathological laboratory is a stigma that every committee is anxious to remove and the research carried on by the expert pathologist should in the long run afford a sound basis for treatment. Perhaps the most important person connected with the mental patient is the nurse, who comes into intimate contact with him in all his moods; in the past the mental nurse has often been drawn from the least trained members of the profession. Now a steadily increasing number are being urged to obtain general training in addition to working for the nursing certificate of the Medico-Psychological Association. The nursing public is beginning to understand that mental nursing is the highest branch of service, demanding gifts which cannot be overestimated. The Commissioners of the Board of Control are urging on mental hospitals the importance of allowing to patients individuality of costume and providing useful occupation in some form of trade or handicraft. A few hospitals have appointed special instructors whose therapeutic as well as financial value is coming to be recognised. There is a growing disinclination to regard mental disorder from its legal aspect. Although at present it is essential for the public and for the doctor that there should be legal safeguards in certain cases, the profession, and the public after them, are beginning to realise that the care of the mentally sick is a purely medical and highly technical matter. The change of opinion is reflected in the fact that in some cases 50 per cent., in others 80 per cent., of the inmates of these institutions are "voluntary boarders," free to leave at 24 hours' notice at any time. It may not be long before 100 per cent. becomes a common record and the certified case is regarded as a slur on the early measures taken. It is realised that mental disease, apart from a small proportion of toxic cases, is a thing of slow development, which leaves time for preventive measures. One superintendent puts biological stress at the head of his list of causation, and such stress is to be recognised and dealt with before the adaptatory functions of the individual have broken down. Another report points out that half of the annual admissions had shown symptoms for more than a year; had competent advice been sought earlier probably few of these would have required certification at all. It is the general practitioner alone who can recognise these early signs and warn the patient or his relatives of the need for care at a time when treatment would be accepted without resistance and breakdown might be averted. Public interest is awakening to the problem of the early mental case, and practitioners must give some thought to the matter if they are not to be found wanting.

AN AMERICAN SMALL-POX EPIDEMIC.

THE Detroit Department of Health has just issued an instructive report on last year's epidemic of small-pox. The rapid growth of this industrial city has attracted a large migratory population which no doubt accounts for the rather high incidence of small-pox in the last ten years. In 1918 there were 893 cases with 6 deaths, in 1920 4 deaths in 1125 cases, but in 1924 a more serious outbreak with 1610 cases and 163 deaths. The high fatality as shown by the following table was largely due to the appearance of hæmorrhagic small-pox.

Case Fatality-rates.

	Cases.	Deaths.	Rate per cent.
Hæmorrhagic ..	124	123	99
Confluent	219	9	4·1
Discrete	441	7	1·6

The names and addresses of contacts being taken usually about midnight, when everyone was at home, provided an exceptionally complete list of those known to have been exposed to contagion. The vaccination history was obtained and the quarantine enforced at the same time. Those exposed to risk could thus be divided into classes according to their vaccination status, and as the subsequent incidence of small-pox is known we have an admirable index of the efficiency of the vaccination shown in the following table:—

—	Exposed to risk.	Number who developed small-pox.	Percentage incidence of small-pox.
Vaccinated within 5 years of exposure	928	0	0
Vaccinated more than 5 years previously ..	1296	27	2·1
Never successfully vaccinated	1350	180	13·3

One table in the report shows the result of exposure according to the type of case to which the contact was exposed and the time of vaccination within the incubation period. The numbers in these classes are small in any case, and as they are expressed merely as numbers and not as rates few conclusions can be drawn. It is worthy of note, however, that 38 persons who were successfully vaccinated within four to eight days from the time of exposure contracted the disease in one form or another. Clearly it is not safe to put off vaccination until one is known to have been in contact with a case. The conclusion which the Health Department of Detroit draws from this experience is that vaccination ought to be compulsory.

AN EAST COAST PORT.

THE annual report of Dr. B. C. Stevens to the Grimsby Port Sanitary Authority gives a good idea of the importance and variety of the medical service of a port. Although no scheduled cases of infectious disease were landed during the year 1924, 38 cases of other disease came under notice, amongst them 18 of influenza. Rats to the number of 1410 were killed in steamers, 1883 in trawlers, 5786 in warehouses and elsewhere about the port; 483 were killed in 12 ships fumigated with sulphur, averaging 41 in each, and 2795 in 91 ships by baits and traps, averaging 31 in each. Of the 9079 killed in ships and port, 543 individuals were black, 8536 brown. Most were killed in May, especially in the warehouses. No remarks are made by the port medical officer on venereal diseases as they affect shipping. Alien passengers, numbering 2219, entered at this port "invariably clean," as the medical officer remarks. Regular inspection of the water tanks of the port led to no complaints. Of 3166 foreign-going craft, 96 were reported to have sanitary defects, and of 238 coasters, 194; 34 sanitary defects were found during 103 inspections of canal boats. 3458 inspections were made of ships and fishing boats; the chief

occasion of complaint being dirt: 374 had dirty food lockers, 49 beds were filthy and destroyed (227 others, not so bad, were ordered to be cleaned), 144 ships had dirty fo'c's'les, 70 had dirty or choked w.c.'s, 33 had dirty galleys or cooking utensils, and 3 had dirty forepeaks, being the compartments just below the crew's sleeping-place, which, if dirty, are a nuisance to them. Also 10 ships were verminous. There were some structural defects: 95 decks leaking, 37 defective drinking-water tanks, 69 defects in lighting, defective stoves 30, defective ventilation 27. Fish arriving unfit for food is made into manure: 400 tons of fish were condemned in the year under review along with much other food. The disposal of refuse from fishing boats still causes offence to the town-dwellers, but the gradual rebuilding of the fish market gives tardy hope of betterment. The number and variety of subjects mentioned in this and other reports of the medical officers of port sanitary authorities show clearly how important are their duties. The sailors in the ships are advantaged in comfort and health by criticism of their surroundings if uncleanly or otherwise unhealthy; any defects which may be found are now more readily corrected than they were, and free treatment for venereal disease is available. The public, too, is advantaged by the destruction of unsound imported foodstuffs, while the constant war on rats is but an incident in the unceasing watch against the entry of epidemic or infectious disease from overseas.

ATMOSPHERIC POLLUTION.

THE tenth annual report[1] of the Advisory Committee on Atmospheric Pollution covers the period from April, 1923, to March, 1924, and is the largest and most interesting report yet issued. The report deals with various aspects of the central problem, and is divided into eight sections. In Section 1 are given the results of measurement of deposit from the air at different stations, classified according to the amount of deposit, the average monthly values being compared with the previous five years' average and a comparison of summer and winter deposits being made. Out of 28 stations the deposit of tar was lower than the five-year average in 21, higher in 3, and equal to it in 4. Tar is a good indicator of the amount of coal smoke. The insoluble sooty matter was below the average in 18 out of 29 stations, and above it in 11. Section 2 deals with suspended impurity. The results were obtained with the automatic filter, and curves are given for two new stations, Blackburn and Stoke-on-Trent. It is curious to observe the peculiarities of the curves compared, for example, with London, as shown in previous reports. Blackburn shows a double maximum on weekdays, the first about 9 A.M., the second about 11 A.M.; it is significant that the first maximum disappears on Sundays. Comparison between the automatic filter and jet-dust counter indicates a close agreement between these methods: about 10,000 particles per c.cm. correspond with about 0·8 mg. per cubic metre. In Section 3 is given a description of the remarkable darkness which overtook London on Jan. 23rd, 1924. The electric load diagrams reproduced give some idea of the cost to Londoners of a smoke effect of this description. Section 4 deals with the jet-dust counter devised by Dr. J. S. Owens, and a full account is given of the technique in using it. Illustrations show a similarity between mould cells obtained in dust records and cells from dead leaves, indicating a possible source of the cells found in the air. A new form of dust counter is described in Section 6. This is used for the examination of very coarse dust and operates by isolating a column of the air to be tested, allowing the dust to settle and examining the particles which fall upon a known area. Section 7 deals with the dust in the upper air, and sets out the results obtained by Dr. H. H. Kimball, of the U.S. Weather Bureau. The average diameter of dust particles collected at an altitude of 10,000 feet is only a quarter of those in the surface air. In Section 8 an estimate is made of the effect of atmospheric pollution upon visibility. Tests made with a specially designed instrument show a range of transmission through 50 feet of air varying from 99·66 per cent. of the light when the number of suspended particles amounted to 210 per c.cm., to 22·7 per cent. when the number of suspended particles was about 80,000 per c.cm. The report appears at a time when public attention is at last concentrated upon the need for purifying the air, and should be a great incentive to measures directed against atmospheric pollution.

[1] Meteorological Office, Air Ministry. M.O. 270. H.M. Stationery Office. 4s.

BRITISH practitioners can again enjoy unrestricted freedom of practice in Italy. The difficulties of the last 18 months have been adjusted, and the General Medical Council has now been officially informed that the Italian Embassy in London has communicated to all the consular offices under its orders the regulations concerning the admissions of British registered practitioners to the privilege of practising medicine in Italy and its dependencies. The new agreement, which reinstates the reciprocity of 1910, comes into force from the date of its signature (May 21st, 1925) without the need for further ratification or approval.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Comdr. W. W. Keir to be Surg. Capt.

W. G. F. Murray, J. G. Maguire, and S. Morrow to be Surg.-Lts.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg.-Lt. Comdr. D. D. F. Macintyre, T. B. Dixon, and L. S. Ashcroft to be Surg. Comdrs.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. C. G. Thomson retires on account of ill-health.

Capt. R. C. Aitchison retires, receiving a gratuity.

Capt. J. Stephenson, half-pay list, late R.A.M.C., retires on account of ill-health, and is granted the rank of Maj.

MILITIA.

Capt. F. L. Tulloch to be Maj.

TERRITORIAL ARMY.

Maj. C. S. Wink and Capt. W. D. Carruthers resign their commns. and retain their rank.

Capt. R. G. Addenbrooke (late Worcestershire Regt.) to be Lt. and relinquishes the rank of Capt.

Capt. G. M. Brown (late R.A.M.C.) to be Capt.

Capt. A. Angus (late Northumberland Fus.) to be Lt. and relinquishes the rank of Capt.

A. H. G. Down to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Capt. A. L. Taylor, from Active List, to be Capt.

ROYAL AIR FORCE.

Air Commodore D. Munro to be Air Vice Marshal.

INDIAN MEDICAL SERVICE.

The King has approved the retirement of Lt.-Col. C. F. Marr.

THE PAYING PATIENT.—On July 7th the Queen opened at the Hospital for Women in Soho-square a new ward containing 12 cubicles for patients who will pay from five to seven guineas a week, in addition to fees to physician or surgeon. The Royal Free Hospital will shortly set aside small wards and private rooms for paying patients.

INTERNATIONAL RED CROSS NURSING. — The Duchess of York last week opened the residence for international students which has been provided by the League of Red Cross Societies, at 15, Manchester-square, London, W. The house will provide a home for nurses from all parts of the the world who come to take the League's courses, now in their fifth year, and those who have already obtained their certificates are teaching at home what they have learned in England. In addition to the English students the Duchess presented certificates to nurses from New Zealand, Holland, Greece, Norway, Czecho-Slovakia, Latvia, Belgium, Austria, Germany, Switzerland, and Siam.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CXXX.

THE TREATMENT OF DISSEMINATED SCLEROSIS.

DISSEMINATED sclerosis is an infective disease of the central nervous system, which usually starts between the ages of 15 and 30. In its typical form the disease is characterised by relapses and remissions. This feature is of the utmost importance in diagnosis and can be explained by the invasion, from time to time, of an organism or its toxin into the brain and spinal cord producing an acute inflammatory lesion. This prevents the conduction of nervous impulses through the affected area. Depending on the situation of the "patch," various symptoms will be produced, such as paræsthesia in a hand, weakness of a leg, failure of vision, a "stroke," &c. After a short time the inflammatory process subsides, often without leaving any permanent damage behind it, and this clinically results in a remission. As the onslaughts on the nervous system become more frequent, or intense, irretrievable damage to important conducting pathways in the brain or spinal cord follows, and a permanent disability, such as a paraplegia, results.

The causative organism has not been definitely determined upon, but there is some evidence in favour of the view that the disease is due to a spirochæte, which, however, is not *Spirochæta pallida*. Spirochætes occur in the mouth and intestines of a large number of healthy persons; they are frequently present in diseased tonsils; they exist in the middle ear in many cases of otitis media, and therefore, presumably, may be present in infections involving any of the sinuses which communicate with the nasal passages.

Clinical Forms.

It must be remembered that the classical picture of disseminated sclerosis, as described by Charcot, consisting of intention tremor, scanning speech, and nystagmus, is present, in its entirety, in only about 14 per cent. of cases. The most important part in the investigation of a possible case of disseminated sclerosis is a close inquiry into the previous health of the patient. In a person between the ages of 15 and 30 the occurrence from time to time of symptoms referable to the central nervous system, which appear suddenly and are often accompanied by slight pyrexia, sometimes earning the name of "influenza," and which clear up as a rule within a few days or weeks, should strongly suggest a diagnosis of disseminated sclerosis, provided the Wassermann reaction is negative. These symptoms, which may occur singly, are: temporary diplopia, temporary blindness, paræsthesiæ in one or more limbs, weakness or stiffness in an arm or leg, precipitancy of micturition or actual incontinence, and attacks of vertigo, often with headache.

Further, the rarer manifestations of this disease should not be overlooked. (*a*) Cerebral form, ushered in by a "stroke," usually without loss of consciousness (sometimes a fit, indistinguishable from epilepsy, may complicate the picture), and attended by a hemiplegia, which clears up quite rapidly. Further "strokes" may occur, affecting the limbs on the same or opposite side. In a person under the age of 40, in whom a hemiplegia occurs, if syphilis, cardiovascular disease, and a cerebral tumour can be excluded, disseminated sclerosis should always be thought of as a possible cause. (*b*) A retro-bulbar neuritis, which is due to a patch somewhere in the optic nerve, producing varying degrees of temporary blindness, may be the first sign of the disease. A similar condition may result from an infection of the sphenoidal and posterior ethmoidal cells, and this must be excluded. (*c*) The spinal form of disseminated sclerosis, characterised by a paraplegia without nystagmus, intention tremor, speech defect, or affection of the arms. Such cases must be differentiated from spinal syphilis, spinal cord compression, and subacute combined degeneration of the cord.

On examining a suspected early case, attention should be paid to the presence or absence of the following signs: Nystagmus; pallor of the temporal half of one or both discs; weakness and ataxia of an upper or lower limb, often with some loss of postural sensibility; exaggeration of the deep reflexes on one side or in one limb; a unilateral Babinski, or even an indefinite plantar response; and diminution or absence of the abdominal reflexes, on one or both sides. If no definite physical signs can be elicited the case should not too rapidly be labelled hysterical, but the patient should be requested to report at once should any deviation from health be observed. It is only in this way that an early diagnosis can be made.

A case of disseminated sclerosis is always a long and protracted affair. The doctor should not be misled, as is often the patient, by the natural remissions of the disease, into believing that a particular form of treatment is proving curative. It is necessary to watch the patient closely, for, unfortunately, it may be assumed that a relapse will sooner or later ensue, and patiently to treat symptoms as they occur. Certain general measures can be laid down.

General Measures.

It is of importance to deal at the outset with all possible foci of sepsis. The mouth should be carefully overhauled, and all septic teeth or stumps removed, but this should not be done in an indiscriminate manner, as a relapse may follow, within a few hours, the too drastic clearance of septic stumps. The tonsils, if severely infected, should be removed. In cases which have shown blindness in the initial stages of the disease, an examination of the posterior ethmoidal and sphenoidal sinuses should be made to exclude infection. The optic nerve is separated from these sinuses only by a thin layer of bone, and therefore an infection may readily pass to the optic nerve, as occurs in cases of optic neuritis associated with suppuration in these sinuses. Any middle-ear infection should be dealt with. The general health should be carefully looked after and over-fatigue avoided. Alcohol and tobacco should be indulged in but sparingly. Special attention should be paid to constipation, which often becomes aggravated prior to a relapse.

During a relapse the patient should be confined to bed at least for a week, but preferably longer, and the diet should be light.

Medicinal Treatment.

Arsenic is the drug that has been used for many years past in the treatment of this disease. It can be administered orally in the form of liquor arsenicalis, commencing with 2 minims thrice daily, gradually increasing the dose so that at the end of three weeks the patient is taking 20–30 minims during the day. At the end of four to five weeks the treatment should be stopped, when mercury and iodides may be substituted. Further courses of arsenic should be given with monthly intervals for several years. Incontinence of urine can be helped by the administration of tincture of belladonna. Painful flexor spasms, which may be troublesome in the later stages of the disease, can be alleviated by the use of hot baths or radiant heat and by a single dose of sodium bromide, gr. 15–20, at night.

Special Forms of Treatment.

In practice such treatment, founded on the assumption that a spirochæte is the causal organism in disseminated sclerosis, is sometimes beneficial, and in a few cases seems to arrest the progress of the disease; but as this form of treatment has been under trial for a comparatively short time, it is too early to judge of its permanent effects. Such treatment is only of use in the early stages of the disease before extensive and irreparable destruction of nervous tissue has taken place. A course of six to eight injections of N.A.B. at weekly intervals may be given, the maximum dose not exceeding 0·6 g. Concurrently mercury should be administered either orally (1 drachm of the liq. hydr. perchlor. thrice daily), by inunction (1 drachm daily), or intramuscularly. Potassium iodide, commencing with gr. 15 and increasing to gr. 30, thrice daily, should also be administered. At the end of the course of N.A.B. the mercury and iodide should be stopped for two or three weeks, and during this time an iron mixture may be substituted. The mercury and iodide should then be resumed, and at the end of a further three or four weeks a further course of N.A.B. should be given. Further courses of treatment should follow with suitable intervals.

Various preparations of organic bismuth compounds have been recently investigated in France in the treatment of syphilis and have been found to possess spirillicidal properties only slightly inferior to those of arsenic. These preparations[1] are given intramuscularly into the buttock. In the treatment of disseminated sclerosis they may be used alternately with N.A.B., or may replace this drug should the individual prove hypersensitive to arsenic. A course consists of 10–12 injections, one or two injections being given each week.

Typhoid Vaccine Treatment.—This non-specific form of treatment, probably allied to protein shock, seems to have a favourable effect in some cases in bringing about a remission. A course of about ten intravenous injections of typhoid vaccine are given at an interval of two days. The first dose is 25 millions, and with each subsequent injection the dose is increased, an effort being made to bring about a moderate rise of temperature after each injection. N.A.B. in small doses may be given concurrently at weekly intervals.

Treatment in the Advanced Stages.—In an advanced case with severe paraplegia any treatment can only be palliative, and the special forms of treatment outlined above are, as a rule, contra-indicated. Arsenic should, however, be given by the mouth.

It is not uncommon to find an hysterical element grafted on to the organic paraplegia. This, if recognised, may be removed by means of persuasion, so enabling the patient to use the limbs more than seemed previously possible. The patient should be encouraged to use the affected limbs, and unless in the final stages every effort should be made to prevent him becoming bed-ridden. Massage is of considerable importance, but even more so are a series of active and passive movements. Electrical treatment is rarely called for and may be injurious. Spasticity may be lessened by passive movements and the application of hot baths or radiant heat. Frequently there is a tendency for contractures to develop in the tendo Achillis; a light aluminium shoe should be worn at night in order to prevent this deformity. Re-educative exercises will lessen incoördination and ataxia. A walking chair may be used in order to give the patient confidence.

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[1] Quinby, bismuthyl, and biquinyl are prepared in France; luatol, bismostab, and bismuth metal in England.

Special Articles.

SOME GENERAL REFLECTIONS ON PUBLIC HEALTH ADMINISTRATION.

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I.

DISTRIBUTION OF LEGAL RESPONSIBILITY BETWEEN CENTRAL AND LOCAL AUTHORITIES.

THE extension of civilisation in all communities and the increasing complexity in the relations between adjacent communities has rendered necessary in every country a review of the conditions of local government. The functions of community government are always found to be divisible into :—

(*a*) Those matters which affect only individual communities;

(*b*) those matters which affect several immediately adjacent communities;

(*c*) those matters which affect in common all communities belonging to one nation.

Of these, (*a*) and (*c*) are naturally fairly well defined, while (*b*) is liable to variations arising from topographical, social, or other conditions.

A brief review of the historical evolution will assist to a comprehension of the basic factors which have produced the present status.

England.

England is the original home of the people of each of the countries discussed, and from England each of these communities derived their traditional conceptions of community government. In the historic evolution of the English constitution, after the country had come definitely under one government, this government consisted of a centralised autocracy, which has become modified by increasing stages, until now each local authority has been granted, by concessions from the central authority, a considerable amount of local self-government. There still, however, persists an indication of the centralisation of power in the obligation (often nominal only) resting upon the local authority to secure the approval of the central authority to many executive acts. At first the subdivision of authority between the central government and the local authority was sufficient for all health purposes, and it remains sufficient still in the case of towns and cities which have a population and a revenue sufficient to maintain an adequate health organisation on modern lines. In the country districts, however, with scattered populations and small revenues, but with most of the public health difficulties in miniature, the maintenance of an adequate health organisation is forming a real administrative problem. Moreover, the increasing inter-relationships between contiguous local authorities have introduced problems beyond the solution of any individual local authority. Consequently, the county administration, embracing often many local authorities, is becoming invested with public health functions to an increasing degree. Not only is this so, but the health authorities are now considering the advisability of grouping together small local rural authorities into health districts within counties.

Virginia.

Virginia was colonised by persons holding tenure by royal favour and persons largely respectful of the established constitutional forms of government. Necessities, however, of the early development of Virginia forced upon the colonists in the different districts of the colony a larger measure of self-government than was customary at the time in England, and in the development of Virginia local self-government has progressed vigorously until the present

condition is that the degree of authority possessed by the local authority is greater than that possessed by the central authority. Consequently, in the large towns the health organisations are as vigorous as, and possibly more vigorous than, the central authority—the State Health Department—but on the other hand the rural districts are very backward and the central authority is now concerning itself with the development of the backward rural communities.

Massachusetts.

Massachusetts was founded by the Puritans in a state of fierce revolt against constituted authority, and in the form of government which they adopted for themselves the central authority of any kind was deliberately omitted, a highly individualised form of government being adopted. The same general basis of government exists to-day. Each local community has practically absolute powers of self-government—the central government (the State legislature) being granted further powers only as these are found to be essential to the common good. In health administration it is found that each community is practically a law unto itself, the central authority—the State Department of Health—being largely without power of supervision or direction, and being given power to deal only with functions of government which concern the State as a whole or a number of local authorities in common. It is, however, fully recognised that the modern conditions of social organisation render necessary the endowment of the State authority with greater constitutional powers than it now possesses, and the State Health Department is becoming invested with greater powers, without, however, as yet any recognition of controlling authority over the actions of local authorities. This gradual surrender of power to the central authority—the State Government—can be traced in the form of the existing Massachusetts health laws. The powers and duties of the State Department of Health are specified thus:—

"The Department shall take cognisance of the interests of life and health among the citizens of the Commonwealth, make sanitary investigations and inquiries relative to the causes of disease, the sources of mortality, and the effects of localities, employments, conditions, and circumstances on the public health. It shall have oversight of inland waters, sources of water-supply, and vaccine institutions. It shall annually examine all main outlets of sewers and drainage of towns of the Commonwealth, and the effect of sewage disposal."

In contrast to this nebulous and indefinite statement of the status of the State Department, the powers of the local authority are thus concisely and comprehensively stated:—

"Boards of health may make reasonable regulations which shall be published once in a newspaper published in the town. All regulations made hereunder which provide a penalty for violation thereof shall before taking effect be approved by the Attorney-General."

It may be noted that the approval is not to be given by the State Department of Health, but by the Attorney-General.

Notwithstanding this general position which apparently largely secures the independence of the local authority, it has been found necessary from time to time to recognise the domination of the State. This is indicated in two stages by the following related sections of the Health Act:—

"If small-pox or any other contagious or infectious disease . . . . exists in any place within the Commonwealth the department shall make an investigation thereof, and *shall consult thereon with the local authorities.* It shall have coördinate powers as a board of health, in every town, with the board of health thereof."

"Towns may establish and maintain dental, medical, and health clinics, and in connexion therewith *may conduct* campaigns of general education relative to matters of public health."

"Every city and every town having a population of ten thousand or more *shall establish* and maintain within its limits a dispensary for the discovery, treatment, and supervision of persons afflicted with tuberculosis. Such dispensaries shall be subject to the regulations of the boards of health of the towns and shall be inspected by and be satisfactory to the department."

The complexities of administration thus produced have been one factor in the creation of the intermediate unit, and the law now reads:—

"The Commissioner shall divide the State into not more than eight health districts."

Each such district has a district health officer who shall act as the representative of the Commissioner with all the powers possessed by the department itself.

It is apparent that Massachusetts from the most extreme form of local self-government has progressed to the creation of district groups for common needs and of State authority for general needs and for unity of authority. The special mention of supervision of water-supply and sewerage may be here indicated as noteworthy.

North Carolina.

In the State of North Carolina, similar in its history to Virginia, the legal public health code gives evidence of the retention of a constitutional form of centralised government, acting at first against a strong tendency to localisation but subsequently going rather to the other extreme and exhibiting an activity on the part of the central authority in matters of detail which are rightly the concern of the local authority. The powers of the central authority—the State Board of Health—are expressed only a little less vaguely than are those of the State Department of Health in Massachusetts, thus:—

"The Board of Health shall take cognisance of the health interests of the people of the State, shall make sanitary investigations and inquiries, shall investigate the causes of diseases dangerous to the public health, the sources of mortality, the effect of location, employments, and conditions upon the public health . . . . In times of epidemics, the State Board of Health shall have sanitary jurisdiction in all cities and towns not having regularly organised boards of health and are empowered to make all such regulations as they deem necessary to protect the public health, and to enforce them by suitable penalties."

The powers of the local authority, on the other hand, are briefly but decisively and comprehensively expressed:—

"The County Board of Health shall have the immediate care and responsibility of the health interests of their county. They shall make such rules and regulations as in their judgment may be necessary to protect and advance the public health."

Notwithstanding this central impotence and local autonomy in the basic legislation, it has been found necessary, as in Massachusetts, to give the central authority paramount jurisdiction in all matters relating to sewerage and water-supply, although the abatement of nuisances remains a function of the local authority. There is, however, seen in the North Carolina code a very curious anomaly—the central authority is entrusted with the supervision of all privies:—

"The State Board of Health, through its officers and inspectors, shall exercise such supervision over the sanitary construction and maintenance of privies as may be necessary to enforce the provisions of this article . . . . the owner of each privy shall pay to the officer or inspector of the State Board of Health . . . . a license fee of forty cents."

The State of North Carolina provides an example of a statutory code in which the predominant power rests with the local authority and also of an administrative organisation in which it has been realised within recent years that the local authorities were not using these powers. In consequence, abrupt transfer of routine detail to the central authority has occurred, supervision of matters of "State-wide" importance, such as water-supply and sewage, has been placed in the hands of the central authority, and an enlightened State administration is now actively concerned in stimulating the local authority by various ingenious devices to a better realisation and a more efficient discharge of its responsibilities.

New York.

The State of New York, cosmopolitan in its history and cosmogenic in its development, provides an example of legal and administrative indefiniteness

which conforms to no general rule. The powers of the central authority—the State Public Health Council—are specified as follows:—

"The Public Health Council shall have power to establish sanitary regulations called the Sanitary Code. The Sanitary Code may deal with any matters affecting the security of life or health or the preservation and improvement of public health in the State of New York. The provisions of the Sanitary Code shall have the force and effect of law. No provision of the Sanitary Code shall relate to the City of New York, and every provision of the Sanitary Code shall apply to and be effective in all portions of the State except the City of New York.

"The provisions of the Sanitary Code shall, in the territory prescribed therefor by the Public Health Council, supersede all local ordinances heretofore or hereafter enacted inconsistent therewith.

"Each city, town, or village may enact sanitary regulations not inconsistent with the Sanitary Code established by the Public Health Council.

"Under the public health law, all local health officers have the power, and it is their duty, to carry into effect the provisions of the public health law and the Sanitary Code.

"The State Commissioner of Health, under the same law, has the power, and it is his duty to exercise general supervision over the work of all local health authorities, except in the City of New York, and to see that the provisions of the public health law and the Sanitary Code are enforced."

The status of the local authority as defined in the Sanitary Code is this:—

"The term 'board of health' or 'local board of health' means the local board, department, or Commissioner of Health, or other body or official of a municipality having the usual powers and duties of the board of health of a municipality."

New York State is a striking instance of a State in which the central authority has paramount powers of wide scope. It is very interesting to find that a great deal of public health advancement is being achieved by this State Council without much resort to legal authority, but almost entirely by example, education, and exhortation.

New South Wales.

New South Wales, founded on a basis of necessary military autocracy in which the good of the community was paramount and the welfare of the individual of little account, has gradually throughout the century and a half of its existence evolved a form of government in which the centralisation of authority still persists to a high degree with a slow release of power into the hands of the local authorities. In the existing form of health administration there is still a greater degree of centralisation than exists in the other Australian States. The following paragraph, from the Health Act, 1915, breathes the old spirit of autocracy which is now rapidly disappearing all over the British Empire:—

"The Board (i.e., the State Central Health Authority) may require the council of a municipality or shire or its officers to do any specified acts in relation to any of the matters mentioned in Part I. of the schedule which might lawfully be done by such council or officers in virtue of any power (except the power to make ordinances or by-laws) conferred or of any duty imposed by any statute, regulations, ordinances, or by-laws, and may in such requirement specify the time within which and the manner in which such acts shall be done.

"If such Council or officers fail to carry out any such requirement as aforesaid, the board may do or cause to be done the said acts, and for that purpose shall have the powers of such council or officers; and thereupon the board may demand the payment to it by the council of any expenses incurred by the board in doing the said acts or causing them to be done. Any regulations, ordinances, or by-laws which relate to any of the matters mentioned in Part I. of the schedule shall, before being made, be submitted to the board. Such regulations, ordinances, or by-laws shall not be made unless the board gives its approval of such of the provisions thereof as relate to the matters aforesaid."

The "matters mentioned in Part I. of the schedule" are:—

"Keeping premises free from offensive or unwholesome matter and the suppression of nuisances arising therefrom. Regulating the storage, sale, conveyance, disposal, and delivery of meat, fish, oysters, and crustacea. Regulating cattle intended for slaughter and regulating abattoirs and slaughter-houses. Sewerage and drainage. The removal of nightsoil, filth, refuse, and garbage, and the destruction of garbage. The construction and situation of privies, the regulation of the degree of closet accommodation. Public urinals, closets, and lavatories. The sanitary requirements of public baths, dressing sheds, and dressing rooms. The regulation and control of common lodging-houses and seamen's boarding-houses. The establishment, control, maintenance, and regulation of infants' milk depôts. The regulation of the interment of the dead.

The central health authority, however, is not so entirely independent as the above quotation might suggest. In the Public Health Act of 1902 there occurs this paragraph:—

"The Board may at any time make a report to the Secretary for Public Works whenever, in its opinion, any danger to public health, or to the health of any persons, could be removed or diminished by the exercise by any water-supply and sewerage board of their powers under any Act . . . . and the Secretary for Public Works shall thereupon proceed as he may think fit."

Victoria.

Victoria, dominated in its earliest years by the influence of New South Wales, has undergone development in a different direction. At an early stage in its career certain local communities revolted against the arbitrary exercise of central authority, and there has consequently developed in Victoria a form of government in which the local authorities exercise in practice a considerable degree of self-government. It will be of interest to quote certain sections of the Health Act of the State of Victoria. The specifications of the powers of the central authority—(i.e., the Commission of Public Health) are as follow:—

"In addition to any other powers and duties of the Commission, the Commissioner may exercise all or any of the following duties: (*a*) To promote the prevention, limitation, and suppression of infectious and preventable diseases. (*b*) To report to the Minister upon matters affecting the public health and upon any amendments which it thinks advisable in the law relating thereto and upon matters referred to it by the Minister. (*c*) To promote or carry out researches and investigations and to make inquiries in relation to matters concerning the public health and the prevention of treatment of disease. (*d*) To publish reports, information, and advice concerning the public health, and in particular concerning the prevention and control of disease and the education of the public in the preservation of health. (*e*) To advise and assist councils in regard to matters affecting the public health. (*f*) To prepare regulations under this Act for submission to the Governor-in-Council. (*g*) To prepare model by-laws for adoption by councils pursuant to this Act."

In order to meet any urgent contingency the Commission is invested with special powers:—

"In any emergency or sudden necessity (of the existence of which emergency or necessity the Commission shall be sole and final judge) the Commission may for the purposes of this Act exercise and perform in any part of Victoria all or any of the powers and duties of a council."

To provide for decentralisation of the administrative functions of the Commission provision is made for the appointment of district health officers whose function are defined as follow:—

"Every district health officer shall: (*a*) Be subject to the directions of the chief health officer; (*b*) report quarterly and also annually to the chief health officer on the public health and sanitary circumstances of the health area; (*c*) make to the chief health officer as occasion requires such suggestions as the district health officer thinks desirable for more effectually promoting the objects of this Act; (*d*) advise and assist as he deems fit medical officers of health and inspectors of councils having jurisdiction in the health area and any part thereof; (*e*) exercise such powers and duties to the chief health officer as are assigned to him under this Act by the chief health officer and perform such duties as are required by the Commission or as are prescribed; (*f*) perform such duties in connexion with the medical inspection of and the promotion of the health of school-children as are prescribed."

Notwithstanding that the duties as here prescribed consist largely of supervision of a paternal nature there are definite powers of compulsory direction. For example, the Commissioner may enforce the appointment of a medical officer of health by any council; the Commission may make regulations "generally,

carrying into effect the purposes of the Act"; and it has reserve powers of compulsion over any council which fails to discharge any of the duties statutorily prescribed.

While there is in Victoria very extensive local autonomy, there is also comprehensive central direction. This relationship is well-illustrated in the following clause:—

"Every council (*a*) may, and when required by the Commission shall make or adopt by-laws for all or any of the purposes for or with respect to which such council is authorised or required to make by-laws under the Act; and (*b*) shall when so required by the Commission revoke, rescind, amend, or vary or suspend the operation of any by-law.

"All by-laws made or adopted by a council under this Act: (*a*) shall be submitted to the Commission; (*b*) shall be subject to the approval of the Governor-in-Council; (*c*) may be revoked by order of the Governor-in-Council.

New Zealand.

New Zealand was at first colonised at separate points by communities with little in common, each having a practically independent form of government. Effective central government has only gradually evolved. In 1900 was passed the Health Act, which to a very large degree centralised authority and rendered all health administration practically independent of local authorities; but this was found to be unsatisfactory, and in 1920 the legal health code was revised. Now responsibility in most matters of health administration is placed directly upon local authorities. This basis of local independence, which is at the root of the New Zealand system of government, has led each of the local communities to acknowledge its responsibilities to an extent unfamiliar in Australia, and is the largest factor in producing the advanced state of progress in public health in New Zealand due to this local independence of spirit. It is probably accurate to say that every town of more than 1000 population has a modern water-supply and a modern water-carried system of sewerage. This spirit of local self-reliance has also been an important element in the success of the Plunkett Society in New Zealand.

The Need for Modification of Existing Arrangements.

It is clear that all of these English-speaking countries, with English tradition as a foundation, have evolved towards an increasing local self-government; but the distribution of authority between the central authority and the local authority has taken different forms in different countries. In England there is the nearest approach to administrative regularity with wide powers of local autonomy and general powers of control and supervision by the central authority. But even in England the evolution of the public health system has produced anomalies—the distribution of health functions between the local authority and the county not being such as to satisfy many whose opinion is valuable. Moreover, the equipment and organisation of efficient public health administration to-day are beyond the resources of many of the 649 rural district councils, and the necessity for finding some more satisfactory system of organisation and for expressing such in the legal code is becoming increasingly apparent.

From these examples it is clear that whether health administration started from a centralised autocracy or from localised autonomy, all governmental systems are reaching, by different paths, a type of health administration more or less uniform. The routine local functions, principally control of the environment, are the concern of the local authority, however large or small. The general direction of health policy, a paternal supervision, and the control of matters of common application are the duty of the central authority. It is in relation to the intermediate unit that confusion exists, and an analytical contemplation of the whole field impresses one with the conviction that difficulty mainly arises from the increasing range of matters of individual hygiene constantly being brought within the scope of official public health administration.

A recent survey of many practical attempts to codify this whole problem in legal expression as well as in administrative experiment has confirmed my opinion that a general review of the administrative public health system, at least in English-speaking countries, is overdue. The excessive attention recently paid to matters of individual hygiene, to "campaigns," "demonstrations," and the like, has obscured the necessity for progressive order and good government marching in step with other progress—and legal and administrative confusion is imminent where it has not already occurred. A definition of functions, possibly a modification of both the legal code and the administrative systems, is required, and particularly it is necessary that the diffusion of functions among many authorities shall cease and a logical system of graded responsibility be introduced.

The State of Ohio, U.S.A., claims to have made a practical step towards the reduction of the confusion. Under the old system there were 1300 townships and 700 towns and cities (with a population of 5000 or over) with some sort of county organisation, but this county organisation did not have any health administrative functions. Under the present system there are 86 counties with good health organisation. All of these are doing what the law says they shall do, and many of these are doing in addition what the law says they may do.

The Commonwealth Government in Australia has just appointed a Royal Commission to suggest an organised scheme of rational progress with defined responsibility distributed amongst the different grades of governmental units, and it is expected that great advances will result from the work of this Commission.

PROCEEDINGS OF THE ROYAL COMMISSION ON NATIONAL HEALTH INSURANCE.*

(*Continued from p. 37.*)

FRIENDLY SOCIETIES' MEDICAL ALLIANCE.

(App. LIII. and Q. 16346–16513.) The Friendly Societies' Medical Alliance represents the majority of the medical institutions approved under the Insurance Act for giving treatment to insured persons as an alternative to the panel system. The Ministry of Health have always held that they had no power to approve any institution not existing at the date of the passing of the National Insurance Act, 1911.

The principal contention of the Alliance in the evidence given by Mr. S. A. Syddall and Mr. Samuel Pride was that facilities should be provided for the recognition of newly-formed institutions and the extension of the radius of existing institutions throughout industrial districts by the opening of branch

* In previous articles the proceedings of the Commission were reported under the following headings: Introductory Note; The Scope of the Insurance Scheme (see THE LANCET, Jan. 31st, pp. 247–8); The Provision of Medical Benefit (Feb. 7th, pp. 301–3; Feb. 14th, pp. 355–6; Feb. 21st, pp. 403–5); Financial Provisions of the Act (Feb. 28th, pp. 454–7); Medical Certification and the Regional Medical Staff (March 7th, pp. 508–9); The Approved Societies and the Money Benefits (March 14th, pp. 564–5; March 21st, pp. 623–4); Evidence of the Hearts of Oak Society (March 28th, pp. 677–9); Evidence of the National Conference of Industrial Assurance Approved Societies and of the Manchester Unity Approved Society (April 4th, pp. 731–3); Evidence of Independent Order of Rechabites, of Rational Association Friendly Society, and of Miners' Societies (April 11th, pp. 784–6; April 18th, p. 839); Evidence of Mr. Alban Gordon (April 18th, pp. 839–40); Evidence of Joint Committee of Approved Societies, of Stock Exchange and Lloyds' Health Insurance Societies, and of Group of Catholic Approved Societies (April 25th, pp. 889–91); Evidence of the National Insurance Beneficent Society (May 2nd, pp. 943–4); Evidence of the British Medical Association (May 9th, pp. 993–5); Evidence of the British Dental Association and other Dental Organisations (May 16th, pp. 1044–6); Evidence of the Insurance Committees (May 23rd, pp. 1097–8); Evidence of Various Approved Societies (May 30th, pp. 1135–6); Evidence of the British Medical Association (June 6th, pp. 1184–6; June 13th, pp. 1248–50; June 20th, pp. 1315–6); Evidence of other Medical Bodies (June 20th, p. 1316; June 27th, p. 1348); Individual Evidence (June 27th, p. 1348); Medical Services in the Factory, Ministry of Health Inquiry Room, Evidence of National Sailors' and Firemen's Union and of Loyal Order of Ancient Shepherds (July 4th, p. 36).

surgeries. It was also claimed that as an insured person may change at any time from one doctor's list to another, a similar right of change between an approved institution and an insurance practitioner ought to exist instead of the present arrangement under which an insured person can only change over at half-yearly intervals.

The total adult membership of these institutions, including insured and uninsured, has declined from 238,000 in 1911 to 160,000 in 1924, and it was pointed out to the witnesses that this hardly appeared to suggest that the institution system was so popular or advantageous to the insured as to justify the case for their extension. The general burden of the evidence so far as this point is concerned seems to be that the institutions had not received fair treatment, and that as they were pioneers in putting something better in the place of the old discredited system of club doctoring and in providing efficient surgery and waiting-room accommodation, they were justified on merits in being more freely established for the treatment of the insured.

In reply to a question as to what an insured person would lose if a partnership or team of doctors were available for him as compared with an institution where three or four doctors were employed, Mr. Pride said that the insured person would lose control.

(Q. 16463.) We think we have a capital arrangement in our institutions. They are controlled by what are called lay committees, but they are composed practically, to the extent of 80 or 90 per cent., of insured persons, and they have a voice immediately in the direction and policy of the institution. They certainly do not with regard to the panel doctor, and you do not find a great many insured persons on insurance committees.

In regard to the investigation of complaints, the witnesses said that the rules of institutions provided the necessary machinery, but that they were quite prepared to accept the same machinery as that applied to panel doctors.

SOUTH WALES AND MONMOUTHSHIRE ALLIANCE OF MEDICAL AID SOCIETIES.

(App. LV. and Q. 16707–926.) The general purport of this evidence, given by Mr. Walter Conway and Mr. Evan Pugh, was the same as that of the Friendly Societies' Medical Alliance—i.e., that the embargo on the approval of new medical institutions should be removed, and that the administrative and financial conditions under which they work should be revised in their favour. It was also asserted by these witnesses that the insurance committees by their requirements interfered with and hampered the institutions on their voluntary side.

The members of the South Wales institutions are, to a large extent, miners, and under a system of payment of a poundage rate on their wages they secure treatment for their families and put up sufficient funds to cover such things as operations, dentistry, and ophthalmic treatment. The witnesses contended that for systems under which such a comprehensive organised effort was possible there should be every encouragement rather than the hampering conditions which at present obtained. They denied that there was any canvassing for members, and as regards any complaints against a doctor, they said that—

(Q. 16782.) Instead of the committee taking it up and dealing with it from what may be called the layman's point of view, we always approach the chief medical officer and let him deal with the matter and discuss it from the medical point of view. If there is anything to be said or done we leave it to him to do it.

With regard to the salaries paid, they said that they were willing to compare the amounts paid by the institutions to their doctors with the amounts paid by the doctors themselves to their assistants, and to stand or fall by the comparison.

FRIENDLY SOCIETIES' MEDICAL OFFICERS' UNION.

(App. LIV.; Q. 16514–16706.) This Union was formed to protect the interests of the medical officers of institutions who felt that they were unfairly treated by the Friendly Societies' Medical Alliance. Dr. D. Holmes, Dr. John Roberts, and Dr. A. Hamilton gave evidence. Amongst other recommendations, they asked that medical officers of institutions should be liable to answer personally in any case of complaint to the duly constituted tribunals for panel practitioners, and that the amount of remuneration paid to medical officers for the panel work should be subject to approval by the Ministry of Health.

Their severe criticism of the way in which these institutions were controlled, with two or three exceptions, led a member of the Commission to ask whether it was really consistent on their part to urge the continuance of this system. The reply was that the system needed reforming and that what they wanted especially to get rid of was the lay control. One of the institutions excepted from their strictures was the Coventry Provident Institution, where the doctors have always had a voice in the management.

ASSOCIATION OF APPROVED SOCIETIES.

(App. XLV. and Q. 14251–14500.) This Association represents 150 societies of various types, with a total membership of 1,500,000. Mr. J. E. Hilton, Mr. Robert Smith, and Mr. F. A. Goodwin gave evidence.

Their recommendations in regard to medical benefit included a suggestion that the capitation fee of insured persons who had not selected a doctor should be applied to the provision of specialist and consultant facilities; another proposal was that members incapable of work should be requested to attend morning surgeries and so relieve the evening congestion.

A good deal of the oral evidence was devoted to the suggested merits of the system of payment by attendance over the ordinary capitation system, and of the merits of the Spahlinger treatment for tuberculosis, which the witnesses appeared to consider that the Ministry of Health and the General Medical Council were cold shouldering. Sir Humphry Rolleston said that he was inclined to expostulate against the suggestion that a doctor would not use a remedy to save the life of a patient unless it was guaranteed or authorised by the General Medical Council.

With regard to maternity benefit, it was said that nearly the whole of the cost of maternity benefit has now to be paid to the doctors, leaving the mother with little or nothing to meet other necessary expenses. They therefore advocated that fees payable for attendance by doctor or midwife should be a statutory charge on the general medical fund, and that a fee of £1 1*s.* be paid, the member being entitled to choose service of midwife or doctor.

STANDING COMMITTEE OF SCOTTISH INSURED WOMEN.

(App. XLVI.; Q. 14501–14592.) The evidence given on behalf of this Committee by Miss Amy Cameron and Miss Margaret Hamilton included the following suggestions:—

1. That definite provision should be made for the payment of sickness benefit to insured women during the four weeks immediately prior to confinement on the production of a medical certificate.
2. That when an insured woman marries, the fact of her marriage should make no difference to her position in insurance, and that she should be entitled to a free year's insurance as in the case of the insured in general.
3. That attendance at a confinement should not be included in medical benefit. It was, in fact, a matter for consideration whether the whole question of provision for maternity should not be dealt with quite apart from the National Health Insurance Act.

The Committee is not in favour of extending medical benefit to the dependants of insured persons on account of the difficulty of proving dependency, and also on the ground that the necessary increase of contributions would be an unfair tax on a very large number of insured women who would never benefit by the extension.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

(App. LVI. and Q. 16927–17126.) Dr. R. A. Lyster, President of the Society, and Dr. J. J. Buchan, of Bradford, said that while the Society fully recognised that much of the improvement in the social and economic and health conditions of the people

is the outcome, more or less indirect, of the National Health Insurance scheme, no real attempt has been made so far to attain many of the most important objects of the original scheme. It has become evident that the present system of National Health Insurance suffers great limitations in its possibility for promoting health, and that profound changes are required if the improvement in the health of the people is to continue to be aided and not impeded by it.

The relationship of the work under the National Health Insurance scheme to that done by local authorities should be of a most intimate nature, because (*a*) the work of local authorities in preventing sickness and physical incapacity and ameliorating disease reduces the demands on National Health Insurance; and (*b*) the material assistance and medical treatment provided promotes the general health of the community.

The witnesses suggested that the voluntary groupings of insured persons in approved societies for the purpose of controlling the funds at present available for health insurance is defective and requires regulation and amendment. In regard to insurance committees, the evidence recites:—

(App. LVI., para 7.) That these committees have certain general public duties, but they have failed to be efficient instruments in the promotion of better health conditions on account of (*a*) the very indefinite character of their duties; (*b*) their very peculiar constitution which results in their being composed, to a considerable extent, of men and women without a sense of responsibility to the public at large; and (*c*) the disregard of a public for a body which has never been representative of them. Insurance committees are, as separate bodies corporate, no longer required. Their duties would be more efficiently carried out by the local health authority.

The present duties of insurance committees in relation to propaganda and education in matters affecting health have been very fitfully carried out, and these duties could with advantage be placed on local authorities. As to maternity benefit, the witnesses thought that the only practical method by which this can be administered in the interests of the mother and child is by requiring local authorities to administer it through their statutory maternity and child welfare committees.

It is the view of the Society that the scope of medical benefit should be greatly extended and its administration transferred to the local authorities; that the advantages of medical benefit as extended should, as far as possible, be made available to the dependants of insured persons, and should also be made available to the poor, the Poor-law medical system being abolished.

For the financing of such an extensive scheme they contemplate that the present Exchequer grant for all services under the Insurance Act should be made available as a nucleus for the enlarged medical service locally administered. The Society believe that medical practitioners should in the future have a direct interest in maintaining the patients' health. Varying payments should, therefore, be made to medical practitioners for work in this direction, the funds for such payments being drawn from any saving resulting from decreased sickness or disablement payments. Up to the present there has been no special inducement for preventive work.

ROYAL MEDICAL BENEVOLENT FUND OF IRELAND. At the recent annual meeting of the Fund, held at the Royal College of Physicians of Ireland, Sir William J. Thompson presided. The annual report showed that the amount disbursed in grants, of which there were 86 in the year, was £1755, as compared with £1540 in 1923–24. The increase of the general fund from all sources amounted to £2109 odd, including £442 15*s*. 10*d*. income-tax refunded for two years. Dividends and interest yielded an increased income of £48 19*s*. 2*d*. Subscriptions paid through branches, including those of the Dublin area, showed an increase of £21 9*s*. 6*d*., while those paid through the central treasurer had increased by £20 5*s*. No legacies were received during the year, and no addition was made to the invested capital of the Fund.

SUMMER SCHOOL OF MATERNITY AND CHILD WELFARE.

THE National Baby Week Council is to be congratulated on the success of its summer school. The proceedings were opened on July 1st by Lord Astor, Chairman of the Council, who read a message from the Queen expressing her warm interest in the movement, and wishing success to the present effort. About 200 delegates from statutory bodies and voluntary societies were present. The method adopted was to have the subject expounded in the first place by various experts and to follow this by a discussion as to how far the views expressed could be utilised for the benefit of the mothers and babies of the country.

The Psychology of Mothers and Children.

Prof. William Brown, Wilde Reader in Mental Philosophy, Oxford, dealt with the foundations of character. He deprecated the tendency, in the present state of our knowledge, to attach exaggerated importance to the action and interaction of the endocrine glands, and explained the principles of psycho-analysis. He pleaded that truth, beauty, and goodness should be rendered attractive to children, that fear and jealousy should be kept out of their education, and that an effort should be made to promote union with the spirit of the universe from the cradle to the grave.

The psychology of the expectant mother was dealt with by Dr. M. D. Eder, of the infant by Dr. Eric Pritchard, of the toddler by Dr. J. A. Hadfield, and of the abnormal child by Dr. A. F. Tredgold. Some of the points made by the various lecturers were: The expectant mother is best helped by allowing her ample leisure for her occupations and work, but when she is in psychological distress an endeavour should be made to arrive at the source of the trouble, or in other words, to make the unconscious motives conscious. The baby has a soul and a personality as soon as it is born, and its mental state should be studied by its reaction to stimuli. For example, intractable crying should be dealt with by investigating the cause of the crying. At the age of 2 a child is full of impulses, for all of which a form of expression must be found; they should never be repressed. Rightly treated the self-willed child becomes the strong-willed man or woman. From 3 to 4 years of age the child begins to learn self-mastery and self-discipline from within by the desire for achievement and the possession of ideals. At first the ideals are acquired from the parents, later they become the child's own. Hence the importance of the behaviour of the parents in order to prevent the acquisition of wrong ideals. The child of weak impulses may be too amenable; the self-willed child who has been crushed may develop into one with a morbid desire to hurt or with a want of self-confidence. The criminal child is one which has acquired, not inherited, wrong ideals. It is better to train a child by giving it a choice than by giving it orders. Children show persistency at a very early age if given liberty and allowed to find something which interests them. A child's achievements should not be praised overmuch. Abnormality in children may be divided into four classes—viz., abnormality in instincts, feelings, intellect, and intelligence. Defects in instinct may interfere with sucking or self-preservation. Combative, acquisitive, and sexual instincts may be exaggerated and another outlet must be found for them; hence the need for more playing grounds. Feelings and the capacity for emotion may be so exaggerated as to swamp the judgment and the control of the consciousness. We have tests for moral perception but not for moral sense. Some people only have a verbal morality and never develop a moral sense. Dull and backward children are a distinct class. The dull, the feeble-minded, the imbeciles, and the idiots are grades of the abnormal. Some children develop

functions early (precocious), others late (backward). Some children are backward as a result of illness. Intellect is to be distinguished from intelligence; many people have any amount of learning but are incapable of applying it. At the opening of the discussion Dr. Maria Montessori stressed the importance of the early years of life, and of endeavouring to bring the child into social life from the first and not to leave it isolated.

Maternal and Child Psychology at Clinics.

The two practical suggestions which emerged from the discussion were the value of periodical talks at the centres with groups of mothers on the treatment and upbringing of their children, and talks with individual expectant mothers about their moods and mental troubles. Dr. Alice Hutchison, of the Tavistock Clinic and Great Ormond-street Hospital, gave her experience of such monthly talks. When they had special evenings for the talks the attendance was poor; lately they had been more successful by adopting the practice of occasionally closing the clinic early so as to give time for a talk. Dr. Grace Calver related her encouraging experience of talks to expectant mothers. Lady Erleigh pointed out the importance of thoroughly investigating the cause when a child did not fit into its family environment. If a child was persistently naughty, the mother should say to herself, "What is wrong with me?" One speaker thought psychology was an unfortunate word. The general impression seemed to be, however, that it was a convenient word to retain for the use of the workers in the movement, as long as it was clearly understood that it implied "the proper handling of human beings as individuals and not as herds."

The Problem of Maternal Mortality.

The third and fourth days of the School were devoted to the consideration of maternal mortality and morbidity, under the chairmanship of Sir Arthur Newsholme. The subject was ably reviewed at the outset by Dame Janet Campbell, and various aspects of the subject were dealt with by other lecturers. Dr. A. E. Giles spoke on preventive medical measures and Dr. Mabel Brodie (welfare medical officer, Durham County) on the social aspect of preventive measures. Dr. R. A. Lyster dealt with the midwives' part, and the point of view of the medical officer of health was considered broadly in a paper by Prof. E. W. Hope.

In the discussion which followed it was made clearly evident that we have a very long journey to travel before we reach a satisfactory midwifery service for the country. Some of the points emphasised were the quite inadequate instruction in obstetrics received by the medical student, the need for better education of the midwives, and for a great extension of antenatal clinics conducted by medical practitioners with an expert knowledge of obstetrics. Dr. S. G. Moore claimed good results for the voluntary notification of pregnancy in force in Huddersfield. Since 1916 the maternal mortality in childbirth in Huddersfield had been 5·01 per 1000 births, but it had been only 2·59 among the "notified" as compared with 6·18 among the "unnotified." Dr. A. F. G. Spinks (Newcastle-upon-Tyne) was also in favour of the notification of pregnancy. Sir Arthur Newsholme deprecated pessimism and pointed to the improvement since the Midwives Act of 1902 came into operation. He also referred to the mistake made when the administration of maternity benefit was put into the hands of insurance committees instead of into the hands of the sanitary authorities. Dr. Harold Waller was very emphatic in his condemnation of the present haphazard ill-organised midwifery service. He said that there was lack of organisation among the London maternity hospitals. Every borough should have its lying-in hospital beds with a complete obstetrical staff for dealing with in-patients and patients treated at home. The women of this country had forced an unwilling medical profession to take measures to save the lives of infants; they must be prepared to do the same for the sake of the mothers. Dr. Elizabeth Macrory referred to the approaching transfer of the Poor-law hospitals, and suggested that each of these hospitals should have wards allotted to maternity work, staffed by skilled obstetricians, who would conduct antenatal clinics and act as consultants both to general practitioners and to midwives. Dr. Dunstan Brewer claimed good results in Swindon from the early investigation, with the coöperation of the practitioner, of puerperal rises of temperature. During the last five years they had had 5000 births in Swindon and no deaths from puerperal sepsis. As a rule, when a rise of temperature occurred during the puerperium doctors and midwives tried to "explain it away," not to explain it. Miss Rosalind Paget put forward suggestions on behalf of the Midwives' Institute: 1. Birth notifications to state the name of the person who actually delivered the patient. 2. A post-mortem to be held on every woman who dies at childbirth. 3. Internal examinations to be made only by medical practitioners or certified midwives. 4. All medical officers of health in dealing with childbirth mortality to be asked to differentiate between doctors' and midwives' cases. 5. Doctors to be asked to employ midwives as maternity nurses. Midwives were feeling the competition caused by the establishment of so many maternity hospitals. 6. The administration and staffing of many maternity homes needs drastic amendment. 7. There is a lack of good consultants for midwives.

CANADIAN PUBLIC HEALTH ASSOCIATION:

THE MILK SITUATION IN CANADA.

(FROM OUR OWN CORRESPONDENT).

AT the fourteenth annual conference of the Canadian Public Health Association, held in Montreal last month for two days, under the chairmanship of Dr. A. Lessard, Director of the Provincial Bureau of Health, Quebec, the subject of infant welfare was discussed in almost all its aspects, but the subject of perhaps the most general interest was the reading and discussion of the report on the milk situation in Canada by a committee of the Canadian Public Health Association. The committee was appointed on Dec. 1st, 1924, to make a study of "milk problems" and to report the findings and recommendations of the committee at the next annual meeting of the Association. The committee named was as follows: Dr. M. M. Seymour (chairman), Regina; Dr. T. A. Starkey, Montreal; Dr. J. A. Amyot, Ottawa; Dr. H. W. Hill, London; Dr. C. J. C. O. Hastings, Toronto; Dr. L. L. Demers, Montreal; Dr. A. J. G. Hood, Montreal; Dr. A. J. Douglas, Winnipeg; Dr. Arthur Wilson, Saskatoon; Dr. F. T. Underhill, Vancouver; and Dr. R. H. Murray (secretary), Regina. All the members of the committee are provincial and city health officers, with the exception of the secretary and Dr. Starkey, professor of hygiene, McGill University. Among the various points of interest in the report it may be noted that the average consumption of 21 Canadian towns which have reported on this feature of the supply showed a per capita consumption of 0·71 pint per day. The per capita consumption of the city of New York in 1923 was 0·54 pint per day. While statistics regarding the relationship of disease to milk in Canada are largely lacking, the report states that the fact remains that milk has been the means of causing more disease than any other single food, and consider it as much the duty of the local health authority to safeguard the milk-supply as it is their responsibility to provide a safe water-supply for the citizens.

Pasteurisation.

Perhaps the most instructive part of the report is that which refers to pasteurisation of milk. In

Canada, with the exception of Quebec, Vancouver, and Victoria, all the larger Canadian cities and towns are in favour of compulsory pasteurisation, and the Provincial Health Departments of Quebec, Ontario, and British Columbia have declared their belief in the efficacy of this mode of dealing with milk. However, it is pointed out that, while theoretically it is most desirable that all milk offered for sale to the public be pasteurised, it is difficult, and in fact practically impossible, to carry on pasteurisation as it should be done in communities with populations of less than 5000. The point is emphasised that any attempt at commercial or unscientific pasteurisation is worse than no pasteurisation, inasmuch as it tends to create a false sense of security on the part of the consumer. According to this report, the consensus of public opinion to-day is that the milk supplied to all urban centres should be pasteurised. But if a city or town is not sufficiently large to warrant the establishment of a modern pasteurising plant, other means must be found to protect the supply or to provide such a plant. It is the opinion of members of the committee that the public must be educated to appreciate the necessity for pasteurisation of milk-supplies, and the question is how the public is to be educated. Various suggestions are made.

Education of the Public.

It would appear, says the report, that the first step towards introducing successfully any sanitary reform in Canadian communities is not so much the education of the public as the education of the medical profession, by whom the public still seem to be guided in such matters, rather than by public health officials. Therefore the committee recommend intensive and continuous propaganda in this direction by every available agency. Testing of herds by tuberculin is recommended for rural districts, although the committee state that it must be clearly understood that tuberculin testing is not an efficient substitute for pasteurisation, and public health authorities must seek to correct the idea which is growing in the public mind in Canada that pasteurisation and tuberculin testing are alternative methods of protecting milk-supplies. The vexed question of certified milk is reported on by the committee, but the matter appears to be in so confused a state that no reliable data are forthcoming, and consequently no definite statements are made. The question, too, of inspection and laboratory control in Canada is unsatisfactory. The report says: "It is doubtful if there is any municipality in Canada with a population of less than 3000 which has a trained dairy inspector to protect the milk-supply."

Conclusions of the Committee.

The conclusions of the committee are that pasteurisation of milk should be encouraged by every practicable means. The following standardised definition for pasteurised milk is recommended by the committee for use throughout Canada: "Pasteurised milk is milk which has been heated to a temperature of not less than 142° F. and not more than 145° F., kept at such temperature for not less than 30 minutes, and then immediately cooled to a temperature of 50° F., and kept at or below this temperature until delivered to the consumer." The committee contend that safeguarding the milk-supply is as much the duty of a municipality as safeguarding the water-supply, and in view of the efficacy of pasteurisation, in their opinion, in preventing outbreaks of milk-borne disease in large centres of population, they hold that municipal authorities should provide and work pasteurisation plants for the benefit of the dwellers in municipalities. This milk report is a valuable and lengthy document, which is well worthy of a close consideration. Its salient feature is its whole-hearted advocacy of pasteurisation, when scientifically carried out, which seems to be regarded by the members of the committee as the only really reliable practicable means at present known of ensuring a fairly pure milk and of warding off disease by the agency of milk.

Among those who read papers at the conference and took part in the discussions on the various matters were Dr. Helen McMurchy, chief of the Division of Child Welfare, Department of Health of Canada; Dr. A. B. Chandler, Child Welfare Association, Montreal; Prof. Raoul Masson, University of Montreal; Hon. Dr. W. F. Roberts, Minister of Health for New Brunswick; Dr. Eugene Gagnon and Dr. A. Plante, Child Hygiene Division, City Health Department, Montreal; Dr. John W. S. McCullough, chief officer of health for Ontario; and Prof. J. G. Fitzgerald, University of Toronto.

Public Health Services.

SCHOOL MEDICAL SERVICE.

STATISTICS from two school medical reports for 1924 are given in the following table:—

Name of district.	No. on roll.	Av. elem. school attendance.	No. of routine children examined.	No. of special examinations and re-inspections.	Percentage of children found on routine examination requiring treatment.*
Nottingham ..	41,349	37,690	12,204	37,600	13·5
Sheffield	81,197	72,416	23,485	107,494	17·5

* Excluding dental defects and uncleanliness.

Nottingham.

School medical officers generally will support Dr. E. M. Wyche in his plea for a quiet, well-lighted, warmed, and well-ventilated room in which to examine school-children. The conditions at present under which such examinations take place in nearly all areas are crude and often necessitate a further examination at some distant clinic, entailing a loss of time for the doctor, nurse, and parent as well as a loss of school attendance for the child. Dr. Wyche discusses practically all the scheduled defects and points the way to ameliorate or even eradicate much of the present morbidity. Hypermetropia being the normal condition in childhood will always be with us, but myopia can to a certain extent be checked by early recognition and treatment followed by sound and sensible school hygiene. Defective dentition often takes its origin in the malnutrition of the mother prior to the birth of the child, so prophylaxis starts with the maternity and child welfare scheme. Mr. H. B. Tawse, the aural surgeon, stresses the necessity of early recognition and treatment of morbid throat and nose conditions which can be done by fully coördinating the welfare services with the school work. The altered attitude of the parents towards remedial methods is all to the good. The Board of Education have shown their appreciation of the work already done in Nottingham by appointing it one of the centres for investigating the causes of enlarged tonsils and adenoids.

Statistical evidence of the progressive value of the school medical work is evidenced in comparative tables for the past few years. Uncleanliness has diminished from 15 per cent. in 1921 to 13·3 per cent. in 1924, tonsils and adenoids from 11·9 per cent. in 1918 to 3·5 per cent., ringworm from 725 cases in 1913 to 297 cases in 1924. Dental defects are now 55 per cent. as against 75·6 per cent. in 1918. Scabies and impetigo, the fellows of dirt and neglect, are rapidly diminishing coincident with an increase of self-respect and well-being which go with cleanly and healthy habits.

A new open-air school with accommodation for 140, and up to date in every respect, is now to be added to those already in existence; this will spread the gospel of fresh air and sunlight and bring happiness, health, and vigour to many ailing children. The

education committee are now considering the question of supplying an ultra-violet rays machine to augment the work of the open-air schools. The success of a camping holiday during August, 1924, which enabled 209 boys to enjoy the "jolliest week of their lives," has prompted Dr. Wyche to submit to his committee that such a camp be organised every year for a period longer than a month with a proper educational curriculum and that girls should benefit equally with the boys. In an inquiry undertaken by Dr. Wyche and the senior assistant, Dr. A. A. Newth, they found that the average educational gain in one year for dull and backward children taught in special classes was 11·9 months—a very favourable result when we remember that the normal child may be expected to advance educationally 12 months in each year. Averaging results amongst small numbers scarcely gives conclusive proofs, nevertheless the increase in educational attainments amongst individually taught dull and backward children distinguished them from definite mental defectives with whom no such results are obtainable. Tribute is paid to the loyal and helpful coöperation of the teachers, attendance officers, and many voluntary bodies by whose aid much remedial work has been made possible.

Sheffield.

The report of Dr. T. Chetwood contains a large number of interesting points usually summarised in a few concise sentences. The general characteristics of the area seem to be expanding work well carried out with a barely adequate staff and a need for the further extension of institutions like the clinics. The percentage of defects found is only slightly below the average, while the percentage treated (95 per cent.) is strikingly above that of previous years (e.g., 67 per cent. in 1914) and is hardly to be improved upon. The only treatment where efficiency is open to any doubt is that of nose and ear conditions for which no clinic is provided by the authority. A line or two in the introduction gives the welcome information that a local medical committee which is studying epidemic encephalitis has the school medical officer as a member. On this subject the school medical service can contribute greatly to general medical knowledge.

A brief but authoritative account of some special observations shows that in nutrition and weight the Sheffield children are now below the pre-war standard. This is the case in some but not all other areas, and it may be related to the circumstance that Sheffield has more than its fair share of unemployment. Defective vision receives some significant comments, such as the reference to its much greater frequency in secondary schools and the influence of home-work.

A special investigation was conducted on the incidence of squint following measles. This was found to have occurred in 53 out of 1973 cases, or roughly 2·7 per cent. The interest was not merely statistical, for the majority of cases received the early treatment that is so essential. Another matter which has not attracted as much attention as it deserves was the condition of spectacles. A sample of boys in a poor school who should have been wearing glasses were seen monthly by Dr. J. H. Campain for six months. It was found that only 43·6 per cent. were wearing satisfactory glasses at every monthly examination, and from our own experience we do not think that these results are very exceptional especially when there are included the instances of glasses bent so as to interfere seriously with the optical centring. Reluctant as we are to suggest fresh burdens for the teachers or nurses, we think that the results of a periodic roll call of spectacle-wearers would amply repay the loss of a few moments' time.

Among infectious diseases chicken-pox has called for more notice than usual owing to the prevalence of modified small-pox in areas bordering on the city. The dental work is unfortunately limited by the somewhat inadequate numbers of dentists, but within the limitations the subject seems to be energetically pursued, with some special attempts to enlighten ignorant parents. At the skin clinic there is noted a very marked diminution of ringworm of a generalised type, attributed to the early diagnosis by the school doctors, nurses, and still more important by the mothers of the children. Special schools are mentioned but seem to contain few children over 14; it will be a great advantage when the promised new school for mentally defective elder boys is set up. Elsewhere this has been found to be a valuable type of school giving the boys stability of character, increase of self-respect, and habits of industry. It is satisfactory to see that dull and backward children are regarded as within the province of the S.M.O.; not only is it his duty to separate them sharply from the mentally defective, but in many cases there are minor defects of the nervous system, sense organs, and the like, which need his special attention.

In conclusion, Dr. Chetwood modestly calls his report imperfect and incomplete. With this statement we are unable to agree. We might wish the report had been longer, but it is certainly not lacking in interest and real value.

MENTAL HOSPITALS SERVICE.

THE annual report of the *East Sussex* County Mental Hospital at *Hellingly* includes the reports of the visiting committee, resident physician, dental surgeon, resident engineer and surveyor, the commissioner of the Board of Control, and the various visiting committees of the guardians and other public bodies concerned with the institution. It concludes with statistical tables showing the movement of the asylum population, the recovery- and death-rate, ætiological factors, and the forms of mental disorder. A visiting ophthalmic surgeon has been appointed, an operating theatre is projected, and it is the intention of the committee to appoint a whole-time pathologist with a trained assistant. The latter is particularly needed for work in connexion with asylum dysentery, which is still a troublesome feature, although the number of cases has diminished during the past year. Apart from a small epidemic of mumps, the staff are able to congratulate themselves on an entire freedom from zymotic disease. The medical superintendent points out the large number of senile cases admitted. The attention of the guardians has already been drawn to the desirability of providing the custodial care, which is all that is required for such people, in the workhouses, thus rendering the patients much happier and leaving the mental hospital accommodation free for recoverable cases. Dr. F. R. P. Taylor gives an interesting table showing the desirability of placing mental patients under treatment as early as possible. This aspect of the work is represented by the attendance of Dr. Taylor at the clinic for nervous disorders at the Princess Alice Memorial Hospital in Eastbourne, although it is desirable that this valuable clinic should reach patients over a wider area of the county than at present. The asylum itself is able to show a satisfactory recovery-rate of 33 per cent. for the males and 42 per cent. for the females. The death-rate, also, reached a record of only 6·6 per cent. in the year. The dietary scale has been revised in a careful and ingenious way, so as to allow ample variety of food without increase in cost. It is satisfactory to note that an increasing proportion of the nursing staff are equipping themselves with the nursing certificate of the Medico-Psychological Association, and the committee has decided to appoint a sister-tutor to aid them in their studies.

The *Cumberland and Westmorland* Mental Hospital is unique in that the greater proportion of its 800 patients are male. This is partly accounted for by the conditions of population, but seems an interesting point that might repay further investigation. The number of admissions during the past year dropped to the lowest on record; most of those were hopeless cases and many of them senile. Nevertheless, a recovery-rate of 42·7 per cent. is recorded—a good

figure under the circumstances. The hospital has been free from all epidemic diseases except influenza. The parole system is used with much success as a preliminary to discharge.

The *Cheshire* Mental Hospital at *Parkside* reports a successful year of work with a death-rate of only 6·2 per cent., in spite of epidemics of influenza and some sporadic cases of dysentery and tuberculosis. A particular feature of this hospital is the occupational therapy, which is under the charge of a special worker, and includes all kinds of healthful and useful activities, organised games, drill, raffia-work, rug-making, and so on. 77 patients have been instructed in some kind of handicraft during the year, and the value of such stimulus in the treatment of mental disease is indisputable. 136 male and 60 female patients have been allowed out on parole, and advance has been made in the employment of open-air and hydrotherapeutic methods. Since the publication of the report arc lamps for artificial sunlight treatment have been installed, and new verandahs provided to the wards. In the laboratory a routine investigation of the endocrine system is in progress, and also research on the superficial vascular system and its reactions in mental disease. Several of the nurses have been allowed leave in order to undergo two years' training in general nursing, an experience which must very considerably increase their efficiency as mental nurses. Female nurses have been successfully employed in the sick-wards on the male side. The report includes a note by the chaplain, who pays a tribute to the devotion and patience of the nursing staff. It is clear that Cheshire may congratulate itself on having one of the most progressive mental hospitals in the country.

The *County Borough of Middlesbrough* maintains some 450 patients in its mental hospital; 60 per cent. of these are usefully employed, and parole and day-leave are used as freely as possible before discharge. The institution has been free from dysentery and enteric fever, and has suffered only from the universal influenza. There is at present no dental surgeon, a defect that will, no doubt, be soon remedied. The recovery-rate reaches the figure of 41·7 per cent. and the death-rate 8·4 per cent. At present the work is somewhat handicapped by the need for a pathological laboratory and for an admission ward, in order that new cases may not have to associate with old and incurable patients.

The *City of Leicester* maintains an excellent mental hospital for 900 patients at *West Humberstone*. The year's work has been as successful as such work can ever be, with a recovery-rate of 44·5 per cent. and a death-rate of 6·7 per cent. There has been complete freedom from tuberculosis and zymotic disease. 77 per cent. of the patients are usefully employed, and every variety of entertainment is provided for them. They run a quarterly journal of their own without assistance; 20 per cent. of them wear their own clothes, and the garments provided by the institution show a refreshing individuality in cut and pattern. It has been found possible to allow 40 per cent. out on parole or leave, and only four cases have abused this privilege. A visiting dentist has been in attendance for two years, and is on a fair way to achieving his ideal of clean mouths in all patients. The malarial treatment of general paralysis has resulted in recovery and discharge in 21·7 per cent. and marked improvement in a further 13 per cent. The medical superintendent places biological stress first of all the causes of mental disease, followed by heredity, syphilis, and epilepsy. It is interesting to note that the ratio of insanity to the population of the town is now only 1:331, whereas ten years ago it was 1:320.

The *County and City of Worcester* Mental Hospital at *Powick* supports 1000 patients. The death-rate during the past year has been 7·58 per cent., partly owing to an epidemic of influenza. The nurses are encouraged to work for the certificate of the Medico-Psychological Association. Parole has been granted to some male patients. The report includes notes by the Anglican and Roman Catholic chaplains, and some interesting statistical tables showing the movement of the hospital populations, the discharges, recoveries and transfers, and causes of death.

The *Glasgow* Royal Asylum presents its 111th report for the year 1924. Its age has not debarred it from keeping abreast with all modern advances in the treatment of mental cases. Voluntary boarders are steadily on the increase and now constitute 50 per cent. of the inmates. Occupational therapy is being extended as rapidly as possible under a skilled instructress, the aim being to make the patients self-supporting. The patients are taking great interest in the work, which includes all kinds of handicrafts, such as chair-covering, basket-making, china-painting, rug-making, &c., and necessitates a sale twice yearly to dispose of the products. A nursing home for incipient cases has been established, and the physician-superintendent urges the need for further coöperation between the profession and public, and education of the latter in the problems of mental disease. Forty-four out of 118 cases admitted had had symptoms for over a year before seeking skilled treatment; the importance of out-patient work, social service, and home care is not yet adequately realised. In Dr. D. K. Henderson's opinion there should be wards for acute mental cases in all general hospitals. The pathological side of the work is looked after in the Western Asylums Laboratory, where research is being conducted on the influence of toxic factors in mental disease, and the effect of combined protein shock and arsenic in general paralysis.

The second report of the *Inspectors of Lunatics for Northern Ireland* is for the year 1923, and deals with 4000 patients in the various asylums of the country. The death-rate has fallen to 8·3 per cent., from the high figure of 12·3 per cent. recorded for 1922. At Antrim it has been found possible to employ an increasing number of inmates, but the staff are not yet adequately trained. Belfast, in common with several English mental hospitals, has tried the experiment of using female nurses in male wards, and is satisfied with their success. Londonderry is handicapped by old and inadequate buildings, and has a death-rate of 10 per cent. The voluntary boarder system does not yet seem to have been adopted in Ireland. The report contains valuable statistics of the causative factors, causes of death, cost of maintenance, &c.

The annual report of the *City of Cardiff* Mental Hospital contains statistical tables, the reports of the visiting committee, medical superintendent and commissioner, and a list of the original papers published by the officers of the institution. An interesting feature of the medical report is the inclusion of observations by the various research workers on the experiments they have conducted. A large series of blood-sugar estimations has been carried out in epileptics and paralytics, and a report has been made to the Medical Research Council on this subject. The effect of adrenalin and of adrenalin with thyroid or thyroxin on the blood-sugar of rabbits has also been studied. The therapeutic effects of tryparsamide were investigated in four cases of dementia paralytica. The examination of gastric digestion in early and recent cases has been continued, and a large number of routine tests have been performed. The estimation of phosphorus and calcium in blood and cerebro-spinal fluid has led to the evolution of a procedure which estimates phosphorus with an error of not more than 5 per cent. The Boltz test is being applied, and seems likely to prove a simple and satisfactory method of diagnosing neuro-syphilis. The treatment of epilepsy by luminal and dialacetin has proved satisfactory. A gynæcologist and rhinologist have been appointed to the staff, and the consulting dentist has made over 500 examinations. There are well-equipped radiographic and hydrotherapeutic departments. The out-patient clinic at the Royal Infirmary

is continuing its work, but is handicapped by the lack of any in-patient accommodation. A sister-tutor has been appointed and the control of the male wards has been placed in the hands of the matron.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 27TH, 1925.

Notifications.—The following cases of infectious disease were notified during the week, namely:—Small-pox, 68; scarlet fever 1315; diphtheria, 799; enteric fever, 56; pneumonia, 637; puerperal fever, 29; cerebro-spinal fever, 5; acute poliomyelitis, 1; acute polio-encephalitis, 1; encephalitis lethargica, 49; dysentery, 6; ophthalmia neonatorum, 116. There were no cases of cholera, plague, or typhus fever notified during the week.

Deaths.—In the aggregate of great towns, including London, there were 3 deaths from enteric fever, 63 from measles, 9 from scarlet fever, 58 from whooping-cough, 24 from diphtheria, and 23 from influenza. In London itself the deaths from influenza numbered 2, from whooping-cough 12, and from diphtheria 5.

Obituary.

THOMAS MARK HOVELL, F.R.C.S. EDIN.,

CONSULTING AURAL SURGEON, THE LONDON HOSPITAL.

WE have already announced the death of Mr. Mark Hovell, the well-known laryngologist, which occurred on July 1st at the house of a relative in Ipswich after a somewhat protracted illness.

Thomas Mark Hovell was born in 1853, but until recently his youthful appearance and active manner belied his age. He was the son of Mr. Dennis de Berdt Hovell, a well-known practitioner in the north of London, and in his day President of the Clinical Society. His mother was Mary de Horne, who came of an old Flemish Quaker family, and on both sides he was able to trace an unusually long pedigree. He was the second child in a family of ten, and inherited the family property. He received his education at Guildford Grammar School and later at the medical school of the London Hospital, qualifying as M.R.C.S. in 1875 and taking later the F.R.C.S. of Edinburgh. He decided early in his career to take up the subject of diseases of the nose, throat, and ear, at that time fairly new as a definite specialty, and was elected surgeon to the Golden Square Hospital as quite a young man. At this hospital the leading spirit was Sir Morell Mackenzie, who, in 1887, took charge of the German Crown Prince, later the Emperor Frederick III. of Germany, whose throat symptoms were already causing great anxiety. This anxiety, in the political circumstances of the time, was shared by the whole world, and the circumstances imparted into the treatment of the Crown Prince a most unhappy element of fierce quarrelling. There is no need to recall the acrimonious differences of opinion which manifested themselves between the patient's medical attendants during the various stages of a disease which ultimately proved fatal. In those disputes Hovell was only implicated in a secondary position, when he accepted Mackenzie's invitation to take resident charge of the distinguished patient, whom he accompanied to San Remo and later to Berlin, where he was in daily and hourly attendance until the end came in the summer of 1888. His records of the progressive condition formed the clinical history of the case, but their evidence, as far as they proved the contentions one way or the other of those who disputed both the diagnosis and the treatment, he left for evaluation to the protagonists in the dispute. He took little or no part in the arguments, but the skill and sympathy with which he discharged his duties as resident surgeon were admitted on all sides, and were specially acknowledged by the patient who conferred upon Hovell the German Order of the Crown immediately upon his accession to the throne.

Upon his return to England Hovell was appointed lecturer on diseases of the throat at the London Hospital, was regularly attached to the staff of the hospital for many years as aural surgeon, and was appointed consulting surgeon at the expiration of his active functions. He was also consulting surgeon to the Golden Square Hospital, and wrote out of his wide personal experiences a treatise on diseases of the ear and naso-pharynx, which was a standard work for many years. He acquired a large consulting practice and his advice was much valued by practitioners, who saw in him a man of much and varied personal experience. In private life he was the kindest and most hospitable of men.

Outside his medical work he conducted for many years an intensive inquiry into the manners of rats. His book "Rats and How to Destroy Them," which was published last year, is a record of patient study extending over some 30 years, and reveals an intimate knowledge of the habits of rats in most conceivable circumstances, showing also how in each particular their persistent assaults can be defeated.

Mr. Mark Hovell married in 1905 the Hon. Margaret Bateman-Hanbury, a daughter of the second Lord Bateman, by whom he had one son.

CHARLES FORBES HARFORD, M.D. CAMB.

Dr. C. F. Harford, the founder and first Principal of Livingstone College, Leyton, died suddenly on July 4th at his residence in Harpenden, aged 60. The youngest son of the late Canon Harford-Battersby, Charles Harford was educated at Repton and Trinity College, Cambridge, and studied medicine at St. Thomas's Hospital, London. He obtained the M.R.C.S. and L.R.C.P. in 1889, and graduated M.B., Ch.B. Camb. in the same year, gaining the M.D. in 1892. On qualifying Dr. Harford went as a medical missionary of the Church Missionary Society to Lokoja, West Africa, returning in 1893 to found the College that offers a training in the elements of hygiene to missionaries before leaving the country. In medicine he devoted himself particularly to the specialty of ophthalmology, and at one time held the posts of ophthalmic assistant at St. Thomas's Hospital and at the Royal London Ophthalmic Hospital. During the war he acted as ophthalmic specialist, holding the rank of Captain in the Royal Army Medical Corps, and subsequently gave his services in that capacity to the Ministry of Pensions, Chelsea. At the time of his death he was refraction assistant at St. Bartholomew's Hospital and oculist to the school clinics of the London County Council and the county of Hertfordshire.

A colleague writes of him: "Dr. Harford's unexpected death will be a blow to many besides his intimate friends. The work which he did as honorary secretary of the Ophthalmic Benefit Committee was undertaken for the good not only of his profession, but, as he firmly believed, for that of the public. During the last six months he had become known to many of his fellow ophthalmic surgeons in this connexion, and it is pathetic that he should be taken just at this moment when his efforts appear likely to bear fruit."

Dr. Harford was an enthusiastic advocate of temperance, and for many years was honorary secretary of the Native Races and Liquor Traffic United Committee, and in 1919 was secretary to the Church of England Temperance Society. He also filled the office of joint secretary in the Society of Tropical Medicine and Hygiene. He is survived by his widow and one daughter.

NAVAL MEDICAL COMPASSIONATE FUND.—At the quarterly meeting of the directors of this Fund, held at 68, Victoria-street, London, S.W., on July 7th, Surgeon Vice-Admiral Joseph Chambers, Medical Director-General of the Navy, in the chair, the sum of £65 was distributed among the several applicants.

INTERNATIONAL CONGRESS OF RADIOLOGY.

THE first International Congress of Radiology was held on June 30th and July 1st, 2nd, 3rd, and 4th, at the Central Hall, Westminster, under the presidency of Dr. C. Thurstan Holland.

The Congress was attended by about 350 delegates, hailing from the Argentine, Belgium, Canada, Czecho-Slovakia, Denmark, France, Germany, Hungary, Holland, Iceland, the Irish Free State, Italy, Norway, Poland, Russia, Sweden, Switzerland, and the United States.

FORMAL OPENING BY H.R.H. THE DUKE OF CONNAUGHT.

H.R.H. the Duke of Connaught opened the proceedings and extended a welcome to the foreign delegates in the large hall. Prior to his speech, representatives from each country were introduced to him. The Duke reminded his hearers that it was now 30 years since Rontgen discovered X rays, and said it was a great tribute to the value of this discovery that in 1925 such a large body of medical men and scientists should have met to discuss further developments of it. The use of the rays to detect faults in steel was now an established procedure, and their application to coal was also making progress. In diagnostic and curative ways, too, the rays had given relief to countless thousands, but further research was needed before the value of the rays in the treatment of disease could be accurately assessed. The consuming question in the minds of medical men and scientists was the cause and treatment of cancer, and such meetings as this for the interchange of ideas and experiences could only be for the common good, besides their mission in fostering cordial international relationships. Not all smaller hospitals were able to have an X ray equipment, and he expressed admiration of the effort being made by the British Red Cross Society to provide the services of mobile X ray units, which could be taken to the bedside of patients. His Royal Highness also referred to the recently formed British Institute of Radiology, the aims of which were to promote friendly relations and the exchange of ideas with other radiological centres throughout the world, to look after the interests of all who were associated with radiology, and to organise teaching and research. In France very valuable work was being carried on, largely by the aid of Government grants for the purchase of large quantities of radium, and Belgium was very energetically prosecuting research into the properties and possibilities of these agents; while in Germany there had been established a definite technique for particular diseases. In this city, he said, we had the Radium Institute, which was employing a large quantity of radium; and the Government had placed at the disposal of the Medical Research Council a large quantity of the salt, which was distributed to a number of hospitals and research centres. The British Empire Cancer Campaign had also been interested in radium and X ray research, and had granted considerable sums of money for approved schemes of research and the supply of radium to centres. In addition the Ministry of Health was conducting inquiry into the results of the treatment of cancer, and it was hoped that as a consequence of this large quantities would be placed at the service of the medical profession. In declaring the Congress open, His Royal Highness said he prayed that every success would attend its labours.

Welcome by the Minister of Health.

The Right Hon. Neville Chamberlain, M.P. (Minister of Health), followed with a speech of welcome on behalf of the Government. He said it was not very surprising that this should have been the first international congress on the subject, seeing that radiology was still in its infancy. When Rontgen made his discovery 30 years ago, only those in close touch with scientific questions could have anticipated what that discovery would yield for the service and benefit of mankind. Very considerable progress had been made of recent years in regard to the application of X rays, radium, and sunlight in the diagnosis and treatment of disease; but each new discovery only seemed to raise the curtain a little higher and to reveal the possibility of even further discoveries. He did not believe that real advance could be made except by the interplay of minds which were continually being devoted to these problems. It was the duty and the policy of this country to do all it could to stimulate and encourage research. At the present time radium was both scarce and dear, and until someone showed how it could be made out of house refuse, or beetroot, he supposed there would always be a difficulty in securing a sufficient quantity of the precious substance.

The path of exploration, Mr. Chamberlain said, had always been strewn with wreckage, and often the explorers in the field of radiology had been no exception in that respect. Earlier in the inquiry regarding these substances and sources of power men had fallen victims to dangers which at the time were unsuspected. All honour to those martyrs who had so suffered, some of whom had lost their lives in the work. It was, however, a comfort to those who suffered in the acquisition of knowledge to feel that they had at any rate buoyed the rocks for others, and through them had prevented suffering by many thousands of fellow creatures. He believed that by the holding of such congresses further triumphs for the benefit of humanity would accrue.

Sir Humphry Rolleston expressed the thanks of the Congress to the Duke for his kindness in performing the opening ceremony, and referred to the close association of this Congress with the British Institute of Radiology, which carried on work in this sphere steadily from day to day. The Institute deserved all possible encouragement, as it was a kind of central bureau where all matters concerned with radiology could be stored, discussed, and provided for the use of any medical man desiring it. It was also a centre of instruction for the men who were taking up radiology as their life-work, as a preliminary to taking their diploma. In addition it was to be the home of the Mackenzie Davidson Library, and the site of a museum in memory of the late Sir Archibald Reid, who had done so much for radiology, particularly during the war, and was a moving spirit in the foundation of the Institute. The Institute would also be a meeting place for colleagues from foreign countries, the Dominions, and the Colonies.

The work of the Congress was carried out in three separate sections—Physics, Electrotherapy and Actinotherapy, and Radiology, of which the respective chairmen were Mr. C. E. S. Phillips, Sir Henry Gauvain, and Dr. A. E. Barclay.

INTERNATIONAL UNITS AND STANDARDS FOR X RAY WORK.

This important question was discussed very fully by a combined meeting of the Sections of Physics and Radiology.

Sir William Bragg, F.R.S., in opening the subject, said that in order that a science might progress it had always been necessary to render comparison of results easy. Lord Kelvin had well said that nothing really progressed until it had been put into terms of arithmetic. The subject of X ray standards was beset with real difficulties, perhaps more so than the choice of any other unit which science had had to devise. One of the greatest difficulties was that due to the difference between quantity and quality, the difference between the amount of energy and the wave-length which carried it. Nor was the subject simplified by the occurrence of scattering of the rays and the consequent formation of new beams. These difficulties made it all the more desirable that the workers in all countries should meet and arrive at an understanding as to the best method of comparing

the results arrived at. Various countries had already been working at the problem, and he was a member of a standing committee appointed by the Rontgen Society and the Physical Society to study the question. To arrive at such an understanding no undue stress must be laid on any one part, for a standard must be largely a matter of compromise. Three grades could be set out: (1) The determination of a scientific unit; (2) a description of a standard apparatus for making comparisons; (3) a comparison of the results of treatment. The last of these was entirely a hospital matter. There seemed no reason why these three problems should not be attacked together.

Dr. Béclère (Paris) said the erythema dose was a biological unit, and took the place of all the physical units previously employed. But the sensitivity of the skin varied within quite wide limits. This, however, would not be so important in regard to dosage if all radiotherapists had adopted the same average value—i.e., the same "h. e. d." This was found to vary not only in the same university, but also in the same clinic according to the apparatus concerned. He regarded the skin erythema dose as an unfortunate standard; there should be a physical unit, common to all countries. A feature of weakness in the ionometric method was the difference in the various electrometers. The German Rontgen Society adopted a unit which was based on the electrostatic unit, as well as that chosen by Villar. The chief need at the moment was that radiologists in the different countries of the world should admit the necessity of standardisation of dosage, and proceed to elect an international committee to study the question and submit such a working standard, to embrace not only the quantity to be given, but also the quality of the rays.

An International Quantitometric Unit.

Dr. I. Solomon read a paper on this subject, in which he said the ionometric was the best method of measuring X rays. It was necessary to express the quantity of X rays in terms of a dosimetric notation of an objective character. The choice of a quantitometric unit instead of the electrostatic unit, with the definite conditions proposed by Behnken and adopted by the German Radiological Society, was in fact very satisfactory; but Behnken had shown that differences in technique would prevent its generalisation.

Dr. Behnken stated, in German, what were the points of value in his suggestion. A paper was also read which had been sent by Prof. H. Martius and Dr. Grebe, of Bonn, on the dosage of X rays in absolute units, and the quantity of radiation necessary for the production of skin erythema. Experiments with a Behnken chamber on one side, and one with air at atmospheric pressure on the other, and the difference in these two conditions was found to be very slight. Neither was there much difference when chambers of 10 and 25 cm. diameter were used. The difference between the values for the production of skin erythema, however, was one which needed to be cleared up.

Dr. Altschul (Prague) said a dosimetre was required which would indicate the dosage at each moment of the irradiation, and he described an instrument which would measure the work of a beam of rays.

Dr. N. S. Finzi seconded the resolution, calling for a standard unit of X ray dosage. The proposed committee, he said, would have to determine first a physical unit, then, if possible, a biological unit. The first of these could readily be settled if questions of priority and country of origin were left out. It was not the first unit which was required for adoption but the best. The question of a biological unit was a far more difficult one, because of the number of factors which must necessarily come in. The biological unit would probably vary with the wave-length of the radiation employed, and with the time during which it was applied. For example, if one gave half units on two successive days, the result would not be the same as that from one unit given on one day. If radium should be used as the standard, he suggested that all the beta radiations should be got rid of by a strong electromagnet. In some of the measurements which had been made the beta rays as well as the gamma were used. He also suggested that the committee might consider whether the question of kilovolts of the supply—i.e., the wave-length—should be taken into consideration in determining the unit.

The Chairman (Mr. E. S. Phillips) strongly supported the idea of an international committee to set up a standard unit of X ray dosage, and asked for a vote on the abstract principle. This was unanimously favourable.

Prof. Sidney Russ (Middlesex Hospital) said that now the need for a physical standard in X ray work had been established he did not think much delay would ensue in bringing it about. But one or two considerations needed to be cleared up before finality could be expected. Comparison of the general resolutions of the English physicists with those emanating from Germany showed some differences of opinion as to what was most urgently required. It seemed to be generally agreed that what should be measured was the ionisation in air, apart from any secondary phenomena which might take place in the walls of the vessel, or any electrode effect, or any other effect than that produced in the process of ionisation of the air. But if a beam of X rays was allowed to enter this air space and a certain ionisation resulted, it was difficult to know what was going to happen when a totally different beam entered that space. If those two beams gave the same ionisation it must not be concluded that they were of the same intensity. It was necessary to decide definitely upon some wave-length as that to which further intensive measurements must be referred. A very interesting question was that as to what was the best wave-length to take before making use of a general expression.

Prof. Wintz (Erlangen) said an international standard of dosage was necessary not only for exact work, but also for settling scientific controversies. It was better to take a definite and definable physical unit than an arbitrary quantity of radium as the standard. International agreement was necessary on two points: (*a*) the fixing of a physical standard unit for measuring primary radiation, (*b*) laying down principles of measurement for the biological dose. In his own clinic a standard had been in use based upon radium.

Dr. E. A. Owen (National Physical Laboratory) said that since the publication of the first results showing the depth and distribution of Rontgen rays in the human body more experiments had been carried out, and determinations made by the photographic method, as well as by ionisation. There was found to be less scattering of rays around the field in deep doses than for more superficial ones, and the character of the curve in the two was different.

Dr. Glasser (America) said that in his laboratory a large chamber had been used for measurement, and the unit had been measured and practically applied.

Prof. Friedrich (Freiburg) said attempts to measure the X ray energy absorbed within human tissue had not been a success; it was necessary to strive after an absolute physical unit.

Dr. Helfelder (Frankfurt) said he felt suspicious regarding the adoption of any one single ionisation measurement, on account of the number of errors which crept into ionisation measurement. Several must be taken at different times. There was no guarantee of uniformity of the rays used at different places.

Prof. Holthusen (Hamburg) said that in checking two instruments with gamma rays it was not certain that the same results would accrue as with X rays. And it was necessary to distinguish between the unit and the biological effect of a given wave-length.

Prof. Crowther remarked that if the energy of the rays and the wave-length could be measured, the radiation would be known absolutely, both as regards intensity and quality. He hoped to see the unit fixed in terms of radium, and for the reason that the gamma

rays of the latter were so penetrating that the ionisation chamber could never be efficiently shielded from them. He trusted that the proposed international committee would adopt something on the lines of the electrostatic unit, as that was quite definite.

Dr. E. C. Ernst declared that the radiologists in America would be only too happy to help forward this work.

A group to work on this matter was decided upon, with Sir William Bragg as chairman.

PROTECTION OF THE WORKER.

Dr. G. W. C. Kaye (National Physical Laboratory, London) opened a discussion on *Protective and Manipulative Methods in Relation to X Rays and Radium* in the Section of Physics. He referred to the birth of a committee for coöperative action emanating from the Royal Society of Medicine and the Rontgen Society, and said the recommendations made by this committee had been widely adopted, and it resulted in a general raising of the standard. One most important result probably was to end the deplorable list of X ray martyrs, and the active support of the Home Office, the Ministry of Pensions, and Ministry of Health had resulted in the extension of the scope of the Workmen's Compensation Act to include lesions caused by exposure to the rays. In a very busy department protection should be much more elaborate than in a department which used the rays only occasionally. In some of their activities the X ray workers could not be completely shielded from irradiation, as some degree of scattered radiation was unavoidable. Various persons showed a different degree of sensibility to the rays, and indeed the same individual differed in his immunity from time to time. Foolhardiness could never be left entirely out of account in dealing with human beings, but the radiologist, realising the danger of dermatitis, possibly cancer, was not likely to tempt Providence in this matter. He did not, however, always appreciate the result of scattered radiation. Rays were given off from the body of a person who was subjected to X rays, and the scattering produced by the air in the room in the vicinity of the X ray tube was something like that of the primary radiation beam. The primary precaution was to surround the X ray bulb with adequate protective material except just at the appropriate aperture, and in diagnostic work screening was necessary for the protection of the operator. If the scattering was excessive, the operator should be behind a screen or wall, and this scattering rendered inadvisable the use of the cubicle system. Each outfit should be protected by walls extending from floor to ceiling, the floor and ceiling themselves also being protected. The target of the tubes should not be pointed towards the controls. The protecting lead for a strength not exceeding 70,000 volts should be at least 1½ mm. thick, and for 100,000 volts 2 mm. thick, 3 mm. for anything beyond. Usually the manufacturer had risen to the occasion; it was all a matter of design. Dr. Kaye said there was a danger in using gamma rays to test the protection of materials, as these made the protection appear much better than the actual. Always wherever possible the bulb should be surrounded by protective material, and if the latter were lead, it must be adequate for the prevention of sparking. All protective boxes should be tested for leakage. He was surprised that the open bulb was still being used, as in many cases it afforded no protection at all, and where it was employed it was often possible to take a radiogram of the hand in any part of the room. He emphasised the need of providing ventilation of enclosed spaces used in X ray work. Where weight of protective material was a consideration, it was important to remember that lead was the lightest of the protective substances commonly employed. For fluorescent screens not less than 2 mm. of lead was indicated, or 1 mm. for portable screens.

Generous ventilation of the X ray rooms was of an importance only secondary to that of actual physical protection; failing this, workers suffered from depression, headache, nausea. Sometimes it was difficult to persuade even hospital authorities as to the necessity of this open ventilation. He also thought that by means of bright paint on the walls these rooms should be made as cheerful of aspect as possible. The floor space for the radiologist should be adequate, and should be of wood, cork, or rubber. The ceilings should be not less than 11 feet high, and the conductors at least 9 feet from the floor. Efficient earthing of all the metal parts was also important, and the main switches should be readily accessible, and there should be no possibility of their being accidentally cut off. Seven hours was a reasonable day for X ray workers, with Sundays and two half-days weekly off duty, and a month annual holiday. He proposed that steps be taken to secure X ray unification.

Dr. E. A. Owen said that barium plaster showed an absorption of the radiation which varied greatly with the thickness of the material; he illustrated by graphs that with an increased thickness the character of the curve altered. It was now necessary to use very large protective boxes for ships, so that in some cases they had to be moved about by means of tackle. In the Phillips tube the protective device formed part of the bulb itself, which was the ideal principle.

Mr. Hector Pilon (Paris) read a paper on Protection in Radiotherapy, in which he reminded the meeting that the X ray bulb radiated in all directions, and therefore enclosure in a box was necessary. But all the boxes were of large size. He illustrated and explained an oil-immersed tube, of the same size as the Coolidge universal tube, and which could withstand 200,000 volts on the direct current. Every part of the glass wall was cooled and had the same temperature, thus the life of the tube was lengthened as no part of it had a larger share of work than did other parts. If the box was earthed, the patient ran no risks of receiving an electric shock. Another device was shown by which the tubes could be placed in a lead cylinder, in which they were easily adjustable in any position. The oil itself was an insulating substance.

Dr. V. E. Pullin (London), who was, he said, looking after the question of protection from X rays in 15 service hospitals, also laid great stress on the need for efficient ventilation. Possibly the feelings of depression and the headaches were due to a physiological effect related to the ionisation of the atmosphere. Forced and efficient ventilation he placed second only to primary protection. He related an incident in which several patients in a ward above an X ray room had ulcers on the back after leaving the hospital, and these lesions were undoubtedly due to radiation having reached them through the ceiling. In this case the X ray tube was not boxed. He believed an X ray tube could be run in oil if the direct current was used, but it was difficult to do so with the alternating current.

Dr. H. Moore (Sweden) said that even with efficient mechanical protection one often thanked God for the law of inverse squares, as it was clear that the operator should always get as far away from the X ray tube as possible.

Dr. Pullin seconded the proposal of Dr. Kaye that some steps should be taken to secure X ray unification, and it was carried.

The Organisation of a Hospital Radium Service.

Prof. F. L. Hopwood, D.Sc. (St. Bartholomew's Hospital), read a paper on this subject, dividing it into three sections: the efficient use of the available radium; protection of patient, operators, and assistants against injurious radiation; and the safe custody of the radium itself. The radium of which he had charge was distributed among 220 containers, and he showed slides illustrating the holders for radium needles, threading devices, and magnifiers for reading identification marks on the needles, all conceived to avoid handling the radium, and, indeed, making

this manipulation easier than handling. Protection was afforded by having only a radiologist apply radium, and preventing a patient discharging himself with radium on him. He also showed the ingenious drawers, lead-encased, in which the radium was kept. Track was kept of every needle and every piece of radium, and was accounted for at the end of each day. He submitted a list of regulations operative in the hospital mentioned, and exhibited specimens of the appliances and boxes used.

Mr. F. H. Glew, who has been handling radium for 20 years, pointed out that notwithstanding all the protective devices against radium emanations there were times when one had to face the enemy in full knowledge that he was the enemy. There were moments when the radium would not shake out of the tube, it had become fixed, almost cemented in it, and a small drill was needed to get it out. It would be delightful, he said, if radium burned at the time of touching, instead of the burn gradually revealing itself some time afterwards. After his long experience he was an advocate of the operator even looking at the radium at as long a distance away as possible. There was great difficulty in removing the active radiation from tubes which had once been charged. He deprecated the use of glass tubes in hospitals and busy centres which were ten years old or more, as their critical condition rendered them liable to explode at any time.

Dr. G. Failla (New York) said that in his hospital colour was largely used for the purpose of identifying tubes at a distance. There they had no open wounds to contend with as a result of the manipulation of radium, though the fingers, especially around the nails, became red and scaly.

Dr. A. E. Stein (Wiesbaden) described a medical *carbon arc lamp*, in which the carbons were placed in parallel series. The arc light was thus formed between the two carbon points which lay one above the other. This position of the carbons enabled the light rays to stream out without any shadowing of the light-crater, which occurred, more or less, in every other form of carbon lamp. The Jupiter[1] lamp was fitted with carbons of a special chemical composition. The result was that these lamps produce numerous ultra-violet rays down to 217, as well as notable proportion of infra-red and heat rays. The spectral values of the light produced by the arc, he held, approached more nearly that of the natural solar rays than those from any other lamp made.

On Thursday afternoon a large party from the Physics Section paid a visit of inspection to the National Physical Laboratory at Teddington.

RADIUM AND X RAY THERAPY.

Dr. S. A. Heyerdahl (Oslo) contributed a paper on the use of radium for *actinomycosis*. In his first case there had been two operations without permanent result, and radium was then tried, and for ten years (to the present date) there had been no relapse. His usual procedure now was to give two or three applications of radium, with a six weeks' interval. The good results lasted for two to ten years.

Dr. F. Tománek, of Prague, who represented the Czech Society of Radiology, related his experiences in treating *pernicious anæmia* with radium, and said that by massive irradiation of the spleen over long periods patients with this condition had been sustained for a long time, even when other treatments, such as blood transfusion, had failed. Radium treatment seemed preferable to splenectomy for this disease. He also read a paper giving his results of prolonged irradiation for *leukæmia*. He used from 80 to 100 mg. of radium over the whole spleen, taking it in 25 sections, giving 80 per cent. of the erythema dose. There was a reduction in the number of leucocytes, the blood picture improved, and at the end of a year no relapse had occurred.

Agent: The Holborn Surgical Instrument Company, Ltd.

Dr. R. H. Stevens (Detroit, U.S.A.) gave an account of his treatment of four cases of *leukæmia* with intravenous injections of radium during the past year. Three had not been successful, as two of the patients had died, but in the fourth 200 mg. was injected last October with marked improvement and a further dose in January, after which the leucocyte count was normal.

Cancer of the Breast.

Prof. Wintz (Erlangen) read a paper on the *Irradiation of Breast Cancer*. He said that the position of X ray therapy in regard to the treatment of cancer of the breast was still very much disputed. He had now at his disposal the results of fully 300 cases of cancer of the breast, which he had treated by the same method between 1918 and 1924. He urged all experienced X ray specialists to publish their statistics, and asked those who had had experience of a few cases only to send their results to him to be incorporated in the collected statistics which he was about to compile. He advised those compiling statistics to adopt Steinthal's classification. Group I.: Where the tumour was restricted to the breast and can be moved; no infection of axillary or supraclavicular glands. Group II.: Where the tumour had already infiltrated the surrounding region; axillary glands palpable. Group III.: Where the glands in the supraclavicular region were palpable and, in some cases, metastases were also apparent. For the final result cases were arranged in two groups. (1) Lost cases, i.e.: (*a*) All those who had died whether of carcinoma or of an intercurrent disease; (*b*) those who could not be followed up; and (*c*) patients who were at the point of death at the end of the three years whether from cachexia or from distant metastases. (2) Clinically cured cases—i.e., those cases in which after careful examination no trace of cancer could be found and whose general condition was sufficiently good to admit of their being regarded as clinical cures. The following statistics were drawn up on this principle:—

	Treated.	Cured.	Lost.	Percentage of clinical cures.
Group I.	21	20	1	95·2
Group II.	41	28	13	68·2
Group III.	44	8	36	18·1

An observation time of three years, he held, was sufficient, especially when those cases who had died from intercurrent diseases were included. At the same time it was advisable to publish observations extending over longer periods since, in the case of carcinoma, it was correct to speak of a cure only after five years had elapsed. For the purpose of comparison he gave first of all the figures for Groups I. and II. for the three-year observation period.

	Steinthal.	Treated.	Cured.	Percentage.
Three years after treatment	I. and II.	62	48	77·0
,, ,, ,, ,,	III.	44	8	18·1
Four years ,, ,,	I and II.	47	31	65·9
,, ,, ,, ,,	III.	36	3	8·5
Five years ,, ,,	I. and II.	35	17	48·5
,, ,, ,, ,,	III.	11	2	18·8
Six years ,, ,,	I. and II.	28	9	32·1
,, ,, ,, ,,	III.	10	1	10·0
Seven years ,, ,,	I. and II.	15	3	20·0
,, ,, ,, ,,	III.	4	—	—

The statistics were similar to those of uterine carcinoma. He said that the results shown by his statistics under Group II. were better than the average results shown by the surgical statistics. Group I. offered ideal competition between the surgical and X ray treatment. If satisfactory results were to be obtained three years after the conclusion of treatment, X ray treatment of the tumour alone was not sufficient. It was essential: (*a*) to apply the requisite dose for the destruction of the carcinoma cells to the axillary and supraclavicular regions as well; (*b*) to give a carefully planned scheme of after-treatment; and (*c*) to take special care when irradiating carcinoma of the breast to prevent lung fibrosis.

Dr. Casman (Antwerp) gave a cinematograph demonstration of the actual burying of radium tubes in the breast in a case of cancer. In cancer in this region he preferred to employ the three processes of X rays, radium, and surgery. From the aspect of pure surgery there were two difficulties—the unsuspected extent of the disease, and the impossibility of surgically removing the whole of it. And it was not always possible to ensure that the needed amount of X ray energy was being absorbed by the new growth. The field for the employment of radium was a more limited one, but the action of this salt was more powerful than X rays. In a given case he began by applying X rays to the whole diseased area. Four or five weeks later he made a small incision and carefully buried radium tubes surrounded by gauze and fixed at a certain distance from the limits of the area dealt with.

Dr. B. J. Lee (New York) reported to the meeting eight cases of primary operable carcinoma of the breast from the special clinic of the New York Memorial Hospital, all of which had been treated solely by irradiation. At least four and a half years had intervened since the commencement of the treatment. Surgery was not employed in this series either because of the patient's age, or in consequence of her refusal of operation. Dr. Lee was somewhat sceptical as to the end-results in the surgery of this breast disease. The oldest patient in the series, aged 90, was made comfortable for three years by this treatment by means of buried radium. At the end of the three years she died from intercurrent disease. The average age of the series was 58. Nodules could be felt in the axillæ of two of the patients. Three women in the series had X ray treatment only. One of them still remained alive, one died two years, the other four years after the treatment. In two radium alone was used, and radium with X rays in the remaining three. One millicurie per c.cm. of radium was the dosage used, while the X rays were administered from a low-voltage tube, with a six-minute exposure, the focal skin distance being 10 inches and the filtration was through 3–4 mm. of aluminium. Of the eight cases dealt with in the paper, five were now alive and well, two had died from intercurrent disease, and one from metastases. The results, he considered, were very favourable as compared with those achieved by surgery in this disease.

Epithelioma of Tongue Treated by Radium.

Dr. C. Regaud (Director of the Pasteur Laboratory at the Radium Institute, Paris) read a paper on curietherapy of epitheliomata of the tongue and their following adenopathy. Of 174 cases so treated 42 were alive and without any symptoms of cancer at the end of 1924, an apparent cure-rate of 24·1 per cent. In 46·5 per cent. the treatment caused at least the disappearance of the cancer at the local site; in the operable cases alone this figure rose to 63·1 per cent. The paper entered into the therapeutic indications and the leading ideas as to technique. X rays appeared to have yielded bad results in cancer of the tongue. Dr. Regaud expressed his preference for radium puncture by means of platinum needles.

Radium Treatment of Cervical Cancer.

Mr. Malcolm Donaldson (London) gave an analysis of the results he had obtained by radium treatment in 85 cases of inoperable carcinoma of the cervix, as reported when he read his paper at the Royal Society of Medicine. He said he had not yet decided whether it would be better to increase the radium intensity or the period of application. He intended that in his next series the number of needles employed should be increased, while the application time should remain at 144 hours.

Dr. Zweifel, of Munich, said he had used in his hospital a combination of radium and X rays latterly, and among the operable cases there had been 43 per cent. of cures, and 7 per cent. among the inoperable.

Prof. Wintz (Erlangen) expressed the view that squamous-celled cervical carcinoma was much more sensitive to X rays than to radium.

ACTINOTHERAPY.

Sir Henry Gauvain initiated a discussion on actinotherapy. He said the chief point to look to was the clinical result of this form of treatment. He believed that the action of light on the patient was two-fold—on the mind and on the body. The experience at the Alton Hospital was that the light caused an improvement in the mental health. On the body the light had a double effect; first the direct one, including inflammatory response and the formation of pigment; secondly, the remote or indirect effects, which he did not enlarge upon. Pigmentation in this connexion he regarded as important, as patients who pigmented frequently did well in other respects. Light therapy was an intriguing form of treatment because of the unexpectedness of some of its results.

On Saturday, July 4th, the members of the Section of Actinotherapy paid a visit to Lord Mayor Treloar's Cripples' Hospital, at Alton, Hants.

X RAY DIAGNOSIS.

Dr. A. E. Barclay (Manchester) characterised *palpation* under the X ray screen as a complex art, requiring much patient practice, as it depended on a combination of touch and sight. The most important palpation of the stomach was that carried out while the first portions of food were entering it, as it would often reveal a filling defect. Radiographic plates were also necessary, however.

The Radiology of Bones.

Dr. A. Howard Pirie (Montreal) read a paper on *Normal Rarities of Bone Simulating Disease.* He showed on the screen an interesting series of cases, demonstrating ununited patella, simulating fracture, double sesamoid bones in the gastrocnemius, pseudo vesicles on each side of the knee-joint. He had met with five cases of rectus sesamoid, just about the acetabulum, which might be present on one side only. This condition, he considered, must be looked on as a normal abnormality, and appeared to have escaped the notice of anatomists. A separate epiphysis may remain on the second metacarpal bone; this, he held, was a reversion to type, as it was seen in the seal.

Dr. W. H. Stewart (New York) spoke on the time factor in the disappearance of rontgenographic evidence of *Fracture of the Skull.* He said experience had taught us that it was a mistake to be definite about the time required for union of the bones of the skull. In children simple fractures might heal in from six to eight months; in adults the fracture line remained for fully three years. Shelving fractures disappeared more rapidly. Fractures of the occipital bone could be recognised three to five years after the accident. The X ray evidence of comminuted or depressed fractures was usually permanent. He emphasised the medico-legal importance of the time factor.

Dr. A. W. George (Boston) described a method of diagnosing injuries of the atlas and axis by taking an X ray picture antero-posteriorly through the mouth and in the lateral position. Three parallel lines were then drawn passing through bony landmarks on the atlas, axis, and third cervical vertebra, and any divergence of these lines indicated pathological conditions. If, in the antero-posterior position, the patient lying on the table, the space between the atlas and axis were obliterated, that indicated disease of the retropharyngeal structures.

Dr. H. A. Harris (London) gave a demonstration on the screen of the developing centres of ossification of the fœtus from the age of 28 days onwards. He said that out of 100 cases of stillborn infants submitted to an anatomy department there was cervical rib present in 35 (in normal adults the percentage is 0·25).

If cervical rib is present in an adult it has not been acquired, but it means it has not been absorbed. The absorption of the cervical rib is the normal process of development.

Sir Frank Colyer (London) described various pathological conditions of the teeth and jaws. Where the pulp of a tooth died, the periodontal membrane might become infected and a granuloma might form. If this granuloma were surrounded by a layer of dense bone, he did not believe that such a tooth gave rise to systemic infection, but where the dense layer was absent, infection did take place. The presence of this dense layer could be determined radiologically, and the speaker urged that it was in questions such as these that the radiologist could be of the greatest help to the dentist.

X Rays and Pregnancy.

Dr. Carlos Heuser (Buenos Aires) demonstrated on the screen a method of injections of lipiodol into the cavity of the uterus for the diagnosis of early pregnancy, fibroids, and non-patency of the Fallopian tubes. By this method it was possible to determine the existence of pregnancy in the first or second month. Injections had been given in 48 cases, and in none had abortion occurred.

Dr. Lars Edling (Lund, Sweden) said that with the X rays he was able in about 200 cases to diagnose pregnancy at the end of the third month or the beginning of the fourth, but not earlier. He had never used lipiodol.

Prof. De Nobele (Ghent) read a paper on the action of Rontgen rays on the evolution of pregnancy and the development of the fœtus. His conclusions were that the erythema X ray dose had an indisputable effect on the evolution of pregnancy in the guinea-pig and the rat; in the majority of cases the embryo died, and the earlier the rays were applied the more certain was that result. If the embryo was not actually killed, it developed into a monster. He found also that irradiation in the guinea-pig produced a tendency to formation of ovarian cysts.

Dr. E. H. P. Cave (Harrow) described his method of examining radiologically the male urethra and the bladder, using lipiodol.

Cholecystography.

Dr. R. D. Carman (Mayo Clinic, Rochester, Minn.) and Dr. Sherwood Moore (St. Louis) each read a paper on the development of this branch of diagnostic radiology, and described Graham's method of the use of sodium-tetrabromphenolphthalein and sodium-tetraiodophenolphthalein. Dr. Carman's paper appears at some length elsewhere in this issue. Dr. Moore said that what was now wanted was more information about the physiology of the gall-bladder, and this was being rapidly worked out.

Dr. G. T. Haenisch (Hamburg) recommended the direct duodenal method, by means of a sound, of giving the dye for diagnostic purposes. In this way unpleasant symptoms were avoided.

Dr. Stewart (New York) said he preferred to put the tube into the jejunum, as thus there was no vomiting.

Dr. R. E. Roberts (Liverpool) said that he used the bromine salts intravenously, and no accidents had occurred when attention was concentrated on slow injection.

Dr. J. T. Case (Battle Creek, Michigan) said that the dye showed up inflammatory processes outside the gall-bladder. At Battle Creek tetra-iodol was used intravenously as a routine method in cases where the dye, given orally, did not enter the gall-bladder.

Dr. Moore, in replying, said that oral administration of the dye should be the routine method, and when the diagnostic result was doubtful the intravenous method should then be adopted.

Studies on the Alimentary Tract.

Dr. De Backer (Ghent) read a paper on the *alimentary canal in the normal infant.* In the discussion which followed, Dr. L. T. Le Wald (New York) said that any case of vomiting in a baby should be examined by X rays for the existence of hypertrophic pyloric stenosis. He considered that the colon in children needed more elucidation. It was held by some that the pelvic colon was unusually long in the first few years of life, and that this was subsequently outgrown; in the speaker's opinion, however, a long colon, if present in infancy, persisted throughout life.—Prof. Gosta Forssell (Stockholm) said that a contraction of the pyloric end of the stomach was often mistaken for contraction of the pylorus. Hypertrophic pylorus might also be present.

Prof. Forssell read a paper on some further observations on the *Motor Mechanism of the Mucous Membrane of the Digestive Tract.* By means of many excellent radiograms and photographs of fistulæ of the small intestine in man, he showed that the folds of the mucous membrane did not depend passively on contractions of the muscular wall of the gut. Other forces came into play, and attention was drawn to the muscularis mucosa. Already in 1913 Prof. Forssell had said that the muscularis mucosa was the independent factor in producing movements of the mucous membrane of the alimentary canal, and this contention had since been more fully demonstrated. The most convincing proof had been from histological studies, when it was shown by a number of observers that the overlapping of muscular cells in the muscularis mucosa occurred in the folds of the mucous membrane this was most distinct in the stomach cavity.

Dr. A. Frankel (Berlin) gave a demonstration of a new symptom of *gastric ulcer*—which he called the cross-bar symptom—within the folds of the membrane by means of Rontgen therapy, and Dr. N. Ratkoczi (Budapest) showed on the screen several cases of duodenal ulcer and adhesions of the duodenum.

Dr. H. H. Berg (Frankfort-on-Main) read a paper on the direct signs of duodenal ulcer, and showed on the screen the effects of various drugs on the motility of the gall-bladder, illustrated by the case of a patient who had a large number of gall-stones in the bladder.

In speaking of intermittent obstruction of the small intestines, Dr. H. M. Imboden (New York) said that if the duodenum were filled and could not empty itself, a hand pressed on the abdomen while the patient took a deep breath would bring about emptying.

Dr. M. I. Lifshitz (Karkow) presented Dr. Lemberg's paper on the rontgenological diagnosis of *chronic appendicitis* based on a study of 105 cases at the Ukranian Radiological Institute, Karkow.

Dr. R. Feissly (Lausanne) discussed the diagnosis of *ileocæcal tuberculosis* in relation to operation findings.

Dr. J. T. Case (Battle Creek, U.S.A.) showed skiagrams of 70 cases of *diverticula of the small intestine.* When diverticula were multiple, the larger ones were nearer the stomach, the smaller ones more remote from it. X rays had enabled him to distinguish false diverticula from true. Three out of four of the 70 patients had no symptoms referable to the diverticula.

Dr. Jacques Forestier (Aix-les-Bains) read a paper on radiodiagnosis by means of lipiodol of *tumours and other causes of compression in the spinal cord.* He emphasised two points (1) that the radiograph must not be taken in the lying position, and (2) that lipiodol must not be injected earlier than the tenth day after the first lumbar puncture had been performed. He also described the injection of the seminal vesicles with lipiodol.

Two most interesting items of the programme were the cinematographic films exhibited by Dr. Lewis Gregory Cole (New York), the one illustrating most graphically the mechanism of the stomach, and the other the spread of tuberculosis in the lungs.

During the Congress an exhibition of radiological studies was on view at the house of the British Institute of Radiology, 32, Welbeck-street, and in the basement of the Central Hall, Westminster, the following firms had assembled a remarkably fine collection of radiological apparatus and matter relating to that specialty:—

Acme International X-Ray Co., Chicago; Aimer, G. C., London; Andrews, Cuthbert, London; Dean, A. E. and

Co., London; Denver Chemical Manufacturing Co., London; Gaiffe Gallot et Pilon, Paris; General Radiological and Surgical Apparatus Co., Ltd., London; Hanovia Quartz Lamp Co., Ltd., British, Slough; Holborn Surgical Instrument Co., Ltd., London; Kahlbaum Chemische Fabrik, Berlin; Kodak Limited, London; Muller, Hamburg; Newton and Wright, Ltd., London; Patterson Screen Company, U.S.A.; Philips Lamps Ltd., London; Radiguet and Massiot, Paris; Radium Belge, Brussels; Rothband, W. S. and Co., Manchester; "Sanitas," Electricitäts-gesellschaft, Berlin; Schall and Son, Ltd., London; Seeman, Dr. H., Freiburg i. Br.; Solus Electrical Co., London; Victor X-Ray Corporation, U.S.A.; Watson and Sons, Ltd., London; X-Rays Limited, London; Zimmerman and Co. (Chemical), London; Zimmerman and Co. (Photographic), London.

LECTURES.

Two formal lectures were delivered during the Congress, the first being the Silvanus Thompson Memorial Lecture, given on the evening of Wednesday, July 1st, by the Duc de Broglie, of Paris. He took as his subject the absorption of x and y radiations and the secondary radiations which accompany them. On Friday, July 3rd, Sir Berkeley Moynihan, of Leeds, as Mackenzie Davidson Memorial Lecturer, spoke on the *relationship of radiology and surgery*. He said that the radiologist had now given certainty to the surgeon's diagnosis—in kidney and gastric diseases errors of diagnosis had proved extremely lamentable until radiology put things right. No words could be too strong, he added, to denounce the action of the surgeon who operated on a stomach case merely because someone—not the radiologist—had made a diagnosis of gastric ulcer which an inspection of the stomach did not confirm. If a case were wrongly diagnosed and medical treatment alone given, then little harm was done—physicians and surgeons might both be at fault, but the fault of the surgeon was far graver. Why could they not arrange, he asked, that no diagnosis of gastric ulcer should be the warrant for medical or surgical treatment until that diagnosis was made by the radiologist or by the surgeon on the operating table? Radiology had also helped to explain why so many diseases mimicked the condition of gastric ulcer. By clinical means, he said, it was not possible to detect gastric carcinoma in the curable stage of the disease, but, given time, the radiologist could diagnose the condition at that stage. The gifts of radiology to medicine and surgery, he concluded, were things for which humanity at large could be profoundly thankful.

SOCIAL FUNCTIONS.

The Congress dinner was held in the Hotel Great Central, N.W., on July 2nd, the President, Dr. Thurstan Holland, in the chair. The company numbered over 400, many lady guests of members being present. The President, in expressing his gratification that the Congress was to be the first International Congress of Radiology, paid a tribute to the work of two pioneers who had recently died, Sir Archibald Reid and Prof. F. Bérgonié, of Bordeaux. The driving force behind this Congress, he said, had been Dr. Robert Knox, chairman of the organising committee, ably assisted in the entertainment of the lady visitors by Mrs. Knox and the ladies' committee. The delegates of the various countries represented then spoke in succession, the order of precedence being alphabetical. There spoke for the Argentine, Dr. C. Heuser; Austria, Prof. A. Schuller; Belgium, Prof. De Nobele; Canada, Dr. Howard Pirie; Denmark, Dr. C. O. Sonne; France, Dr. A. Béclère; Germany, Prof. A. Dietlin; Holland, Dr. Heilbron; Hungary, Dr. N. Ratkoczi; Irish Free State, Mr. M. R. J. Hayes; Italy, Prof. M. Ponzio; Norway, Dr. S. A. Heyerdahl; Poland, Count Debecki; Russia, Prof. M. Nemenow; Czecho-Slovakia, Dr. W. Altschul; Sweden, Prof. G. Forssell; Switzerland, Dr. R. Feissly; and the United States of America, Dr. P. M. Hickey. The dinner was marked by pleasant cordiality, both international and individual, and concluded with a dance.

The League of Nations Union entertained the delegates to luncheon at the Hotel Cecil, Strand, on Friday, July 3rd, Lord Cecil of Chelwood in the chair. He said that the science of radiology owed much to international thought and action, and as the conference in London was an example of internationalism in science, the League of Nations Union was delighted to extend to the delegates the warmest welcome. Dr. John Muir, assistant secretary of the Congress, replied.

On Saturday afternoon, July 4th, at the conclusion of the Congress, a garden party was held at Imber Grove, Esher, by invitation of Dr. E. R. Morton, the chairman of the hospitality committee.

THE INTERNATIONAL COMMITTEE

At the final meeting of the delegates on July 4th an international committee was formally constituted, with Prof. Gorsta Forssell of Stockholm, Sweden, as chairman; Dr. C. Thurstan Holland, of Liverpool, as vice-chairman; and Dr. Stanley Melville, 9, Chandos-street, London, W. 1, as secretary. It was decided to hold the next international conference at Stockholm in 1928.

Correspondence.

"Audi alteram partem."

DISABLEMENT FROM CHRONIC RHEUMATISM:

THE NEED FOR A CONCERTED EFFORT.

To the Editor of THE LANCET.

SIR,—Official returns in two countries[1] have recently set forth the prevalence of disablement from rheumatic diseases. In Sweden, as no doubt elsewhere, *senility* and *cardiovascular degeneration* account for more than half the cases of permanent pensionable invalidity. Apart from these "incurable" causes, *articular rheumatism* comes first among the list of disabling maladies, accounting for 9·1 per cent. of the Swedish cases, as against 5·8 per cent. accounted for by pulmonary tuberculosis. The British Ministry of Health, in their classification of "rheumatic diseases," include almost equal numbers of articular and non-articular cases, such as lumbago. Adopting this wider use of the term, rheumatism causes (as we now know) nearly one-sixth of the total industrial disability in England, with an estimated expenditure of £2,000,000 for sick benefit and a loss of 3,000,000 weeks of work per annum. If non-articular cases were included in Sweden, the proportion would probably be much the same (one-fifth to one-sixth of the grand total).

Dr. Kahlmeter makes it clear that rheumatism and tuberculosis are by far the most important causes of disablement (from disease), and that rheumatism imposes a heavier economic burden than appears from the statistics, because the invalidity caused thereby is of long duration, entailing not only a great deal of mental and physical suffering, but a heavy expense to the community. He also points out that the other main disabling diseases are relatively well cared for, but that rheumatism receives little assistance. In Holland and Germany also, we understand that the disablement of workers from this cause is an equally serious problem. Dr. Kahlmeter may well ask whether the State cannot do something to mitigate the disability of such large numbers of workers.

It has been pointed out in the report of the Ministry of Health that treatment of chronic rheumatism is entering upon a more hopeful phase. It is all to the

[1] The Incidence of Rheumatic Diseases. Ministry of Health Reports, No. 23. London. 1924. Examen statistique des causes d'invalidité, fait d'après les demandes adressées à la "Direction des Pensions de Retraite" pendant l'année 1918, sur lesquelles les pensions supplémentaires furent accordées. Par G. Kahlmeter, Docteur en médecine, Médecin consultant de la "Direction des Pensions de Retraite," Stockholm. Acta Medica Scandinavica, vol. lix., Fasc. i.–vi.

good that the dangers of chronic focal sepsis are now better recognised and provided against, but in our opinion this is only half the battle. In all likelihood there are ætiological factors apart from sepsis, as is evidenced in osteomalacia, which is probably a deficiency disease, by changes in the spine indistinguishable from spondylitis deformans. Chill, traumatism, tubercle, and endocrine disturbance are other probable factors in causation. The investigation of possible metabolic abnormalities is urgently required, and should be one of the chief functions of any clinic established to deal with chronic rheumatic diseases. At the same time the effects of physical remedies—heat and cold, radiant and electrical energy and movement, and the internal use of waters—should be studied and their efficacy compared. In the present state of our knowledge we can but advocate measures directed to improve the general health, to prevent the development of rheumatic tendencies, to increase the resistance of the body to infection, and to promote the absorption of exudations and deposits.

A Committee on Rheumatism has now been appointed by the International Society of Medical Hydrology. It will take these official reports as the basis of its inquiries, which will have for their object some concerted action in the campaign against rheumatic disability in the countries most affected thereby. Practitioners at the health resorts with experience in the treatment of rheumatic diseases, who are disposed to assist the work of the Committee, are requested to communicate with Dr. Ray at 6, Bentinck-street, W. 1.

May we quote two examples of the treatment of chronic rheumatism, carried on for a long period of years, in order to indicate what might be done, with an ampler organisation and equipment?

(1) A charity was founded at Buxton more than 300 years ago for the treatment of the poor suffering from rheumatic disorders. It is unnecessary to quote the figures, but the Devonshire Hospital now accommodates large numbers of industrial workers, recommended by the approved societies, from all parts of the country, many of the more serious cases returning from year to year. It may be added that many observers have recorded strong reactions in rheumatic patients submitted to the Buxton waters. We have here, for many generations, a customary treatment of chronic rheumatism, presenting now a large field for the differentiation of cases and for the scientific use of certain physical methods.

(2) In Holland, where there are no spas, a clinic for physical treatment was opened at Amsterdam in 1905. Since that date about 10,000 rheumatic cases have been treated by baths, manipulation, and electricity. Articular and non-articular cases were in about equal numbers, with many mixed cases. One of us (J. v. B.) has had under his own care during the last 15 years nearly 5000 cases of chronic arthritis, many of which, after temporary improvement, return year by year. The following conclusions are drawn from the work of this clinic: (*a*) A sedentary life in cold, damp localities plays a great rôle in the development of chronic rheumatic affections. (*b*) Persons of an arthritic tendency are numerous in Holland, especially among the intellectual classes. When they are exposed to unfavourable external conditions or to accidental toxic invasion, rheumatic developments occur. (*c*) In these cases the connective tissues become a place of lowered resistance, favourable to inflammatory changes, to parasitic growth, and to atrophy. (*d*) The influence of mental depression, tuberculosis, and dental sepsis is unquestionable, and that of auto-toxæmia from the bowel probable. (*e*) Expert treatment at a suitable clinic may, even in unfavourable and progressive cases, mantain the function of the joints, so that invalidity is prevented, whilst treatment by drugs alone is insufficient for this purpose.

We are glad to note that the British Report emphasises the need for further development in the treatment of rheumatism at the spas and elsewhere. Certain natural waters and baths are of proved efficacy in chronic rheumatism, and, with selected methods of accessory treatment, in our opinion, ought to be made available under proper conditions for the greatest possible number of industrial cases. But the spas can only handle a fraction of the needful cases. Is it not possible to provide clinics for rheumatism in the towns? War-time experience with other forms of disability has shown the great value of clinics, where large numbers of cases can be investigated and treated.

We are, Sir, yours faithfully,

J. VAN BREEMEN.
R. FORTESCUE FOX.
L. J. LLEWELLYN.
E. P. POULTON.
M. B. RAY.

International Society of Medical Hydrology, 36, Devonshire-place, W. 1, July 1st, 1925.

OUTBREAK OF GONORRHŒA IN A CHILDREN'S HOME.

To the Editor of THE LANCET.

SIR,—On Jan. 26th, 1924, 17 girls between 6 and 10 years old, living in an exceptionally well-administered home, were notified as suffering from gonorrhœal vulvo-vaginitis, confirmed by bacterial examination. Careful inquiry as to the only two admissions in January revealed the fact that one of them (aged 11), admitted on the 11th, was found on the 25th to be suffering from a profuse gonorrhœal discharge. During her mother's absence in service she had been "running wild" and "had intimate relations with men and received money from them."

The home possessed a sufficiency of small slipper-baths, each child had her own towel, and one or more attendants were present during bathing. But as the number of children was large, the possibility of bathing in common could not be excluded, and I formed the definite opinion that the infection was thus spread. Efficient steps were at once taken to prevent further infection, and the management of the outbreak was entrusted to Dr. H. Gluckman, director of the Municipal Venereal Diseases Clinic, whose treatment was on the following lines:—

Bed for ten days; hot sitz-bath twice daily with ʒi. pot. permang. solution (4 per cent.) to each gallon water; then swabbing external genitals with $AgNO_3$ sol. (gr. v. to oz.), followed by hot vaginal douche with pot. permang. sol. (1 in 5000). As improvement resulted, bathing and douching gradually reduced to bi-weekly or weekly douche only. In the more resistant cases, small doses of detoxicated gonorrhœal vaccine were given every fifth day, commencing with 3 minims and gradually working up to 10 minims. In a few cases, complicated by secondary infection, a solution of oxycyanide of mercury (1 in 4000) was used now and again as a vaginal douche instead of the pot. permang.

The effects of treatment were gauged by bacterial examination of vaginal smears. In most cases it was possible to cease treatment in about ten weeks; in a few there was a short temporary relapse. By the end of nine months all were giving a negative result. This has persisted since then, in spite of provocative measures—e.g., silver nitrate instillations, injections of vaccine, and strenuous exercise.

It will thus be seen that most of the sufferers responded readily to treatment, but the eradication of gonorrhœal infection (especially in an institution) is a tedious matter, and nine months passed before a consistent succession of negative bacterial reports justified a clean bill of health.

I believe such an outbreak to be unique in public health records, and its lessons seem to be two-fold: 1. The careful examination in this respect of all new admissions. 2. That baths in barracks, boarding schools, and institutions should be mainly of the hot and cold shower type (both for individual safety and for water-waste prevention) with only such provision of "slipper" or "parallel" baths as may be necessary for medical and surgical reasons.

I am, Sir, yours faithfully,

CHARLES PORTER, M.D. R.U.I., D.P.H. Camb.,
Hon. LL.D. (Witwrd. Univ.), M.O.H. and Lecturer on Public Health, Johannesburg.

*** The outbreak reported by Dr. Porter if not unique is sufficiently startling to require comment. The measures of prevention he suggests are sound and reasonable. Many little girls are carriers of

gonorrhœa as a result of infection by towels, w.c.'s, and lavatories, and the youth of a child by no means precludes the possibility of her having gonorrhœa, though such sexual precocity as was found in Dr. Porter's case is rare. No towels, baths, or bedroom chambers should ever be shared by girl children in institutions. This should be a rule admitting of no exceptions. A similar outbreak observed this year at a convent home for older girls in a home county was traced to infection from one or more imperfectly cured cases of gonorrhœa by towels and baths. Facilities in this case were admittedly insufficient, as the institution, though well run in many ways, was short of funds.—ED. L.

THE HOSPITALISATION OF SEVERE TRAUMA ON THE SPOT.

To the Editor of THE LANCET.

SIR,—During the last few days the daily journals have described many a case in which an injured person, after an accident, has died on the way to hospital, or soon after admission. For long it has been my contention that movement, even for a short distance, is the worst possible treatment after any injury; shock is made greater; there is grave risk of injuring soft and vital parts; there is likelihood of re-starting loss of blood; there is serious danger of embolism; there are many possibilities of causing and increasing deformities.

An illustrative episode may serve to bring this home to those who have been schooled in the present regime. Last year I saw a severe injury—compound comminuted fracture of two limbs—nine days after the injury. During these days there had been a minimum of movement, the parts being left undisturbed; and at the end of that time the patient travelled a distance of about a mile from the scene of the injury, and came under my care at a cottage in the country. To my surprise I was able daily to manipulate the fragments into position without causing pain, and to get an ideal result. Not only so, but as the injury of one limb was adjoining the site of an old traumatic deformity, I was able to rectify that at the same time. The cost was trivial, and I did the nursing myself.

This incident confirmed my former conclusion of the wisdom of the advice: *Put a case of trauma into the nearest available bed.* The occupant of the house is not English—I had almost written British—if admission is refused. Some may argue that there is an absence of technical nursing in a rural house. But he is a poor over-schooled doctor who cannot quickly instruct a sister, or a neighbour, to nurse and manage everything well. The finest result that I ever saw after complete transverse fracture of the patella happened where a mother, unschooled but educable, tended her son in his home.

It may be urged that transport facilities are now such that there is no danger. That is just the sad fallacy of it all. Let a well person travel a distance of five miles in the most elaborately equipped ambulance, assuming the posture and position of a badly-injured patient, and he will quickly change his mental attitude towards the treatment of severe traumatism.

I am, Sir, yours faithfully,
R. CUNNINGHAM AFFLECK.

Edinburgh, June 30th, 1925.

A BELGIAN MEDICAL CRUISE.

To the Editor of THE LANCET.

SIR,—After all the causes for gratitude that the Belgian doctors, since the war, owe to the British doctors, the "Medical Days of Brussels," at which your Government was officially represented, have again drawn closer together the bonds which unite our two medical bodies. In these conditions, desirous of giving a tangible proof of our friendship, we have decided to invite our British colleagues to take part in a medical cruise to the Near East which we are organising. I shall be grateful if you will kindly insert the enclosed notice. Application may be made to me.—I am, Sir, yours faithfully,

Dr. R. BERNARD,
Secrétaire de la Rédaction. Bruxelles-Médical, 117, rue du Trône, Brussels.
July 1st, 1925.

Medical Cruise to the Near East: Itinerary.

Marseilles, Alexandria, Cairo, Port Said, Jaffa (Jerusalem), Beyrouth (Damascus-Liban), Smyrna, Constantinople, Le Pirée (Athens), Malta, Naples, Marseilles. Departure August 24th; return, Sept. 18th. Special conditions; 2700 French francs each for doctor and wife, 3600 French francs for each member of a doctor's family. The voyage is first-class by the large and luxurious packets *Cordillère* and *Lotus* Oriental mails. There will be an opportunity of visiting Cairo, Jerusalem, Damascus, and Athens, and of prolonging by 12 days the stay at Beyrouth in order to visit thoroughly Syria and Palestine. It will also be possible to visit Baghdad, three days by motor-car from Beyrouth.

A DISCLAIMER.

To the Editor of THE LANCET.

SIR,—My attention has been called to a report in the *Daily News* of my annual hospital tea party. Although I was aware that the occasion was to be used for giving publicity to the hospital building fund, I had no knowledge that personal allusions were to be made to myself. I much regret that in the report references were made for which I am in no way responsible, and which are both undesirable and unnecessary. I am, Sir, yours faithfully,

London, W., July 4th, 1925. H. J. PATERSON.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Spahlinger Treatment.

THE Parliamentary Medical Committee met on July 2nd, to consider a report from five of its members who recently visited the establishment of Mr. Spahlinger at Geneva. The report commented favourably on the visit, and suggested that an effort should be made to raise £100,000 in this country by means of a public campaign to enable Mr. Spahlinger to continue his work. The Committee passed the following resolution:—

"That the Parliamentary Medical Committee has received with much interest the account of the visit to the Spahlinger establishment which the five members of the Committee have drawn up, not as a delegation from the Committee, but as private individuals. The Committee are of opinion that a prima facie case has been made out for further investigation, but the Committee resolve that they cannot as a corporate body take any action in the matter."

HOUSE OF COMMONS.

WEDNESDAY, JULY 1ST.

Night-work in Bakeries.

Colonel WOODCOCK asked the Minister of Labour whether His Majesty's Government proposed to take any step to refer to the Permanent Court of International Justice the question whether the draft convention in regard to night-work in bakeries proposed by the recent International Labour Conference, which related to an industry which was not the subject of international industrial competition and which prohibited night-work by master bakers as well as by persons employed, was consistent with the purpose of Part XIII. of the Versailles Treaty of Peace, and also the question of the competence of the conference to pass such a draft convention.—Sir A. STEEL-MAITLAND replied: This convention, as finally presented to the recent International Labour Conference, was not acceptable to His Majesty's Government, and their representatives voted against it. It is not the intention of the Government to take any further steps with regard to the convention in the direction indicated.

Persons Excluded from Pensions Bill.

Mr. TREVELYAN THOMSON asked the Minister of Health the approximate number of persons who, on account of their not being insured under the National Health Insurance Acts, would be excluded from all benefits under the proposed Pensions Bill, and the proportion which would be wage-earners.—Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) replied: So far as the first part

of this question is concerned, I would refer the hon. Member to Tables F and G on pp. 41 and 42 of the Government Actuary's Report on the Bill. These tables show in some detail the total population of each sex and the corresponding insured population. In regard to the second part of the question, the compulsory provisions of the Bill apply to practically all wage-earners who are either engaged in manual labour or are employed at rates of remuneration not exceeding £250 a year, and provision is being made for the continuance, on a voluntary basis, of the insurance of wage-earners who cease, or have already ceased, to be included in these categories.

The Use of Artificial Light.

Mr. KENYON asked the Minister of Health whether, before sanctioning the setting up of institutions for the use of artificial light by local authorities, he would satisfy himself that a doctor experienced in this work was available.—Sir KINGSLEY WOOD replied: The answer is in the affirmative.

THURSDAY, JULY 2ND.

Water Shortage at Saltash Hospital.

Colonel DAY asked the Minister of Pensions whether, seeing that there was a shortage of water at the Ministry of Pensions Hospital for neurasthenics at Saltash, and that 450 patients and a large staff had not the necessary supplies, he would allow the patients to return home and continue to draw full treatment allowances.—Major G. C. TRYON replied: The temporary shortage of water which prevailed for a few days at Saltash Hospital has now disappeared. The supply for the last fortnight has been normal and is adequate for all requirements. I do not anticipate any further difficulty.

Closing of Oulton Hall Hospital.

Mr. LUNN asked the Minister of Pensions whether it had been decided to close the hospital at Oulton Hall, near Leeds; if so, on what date he proposed to close it and for what reason; was he aware that Oulton Hall was the only neurasthenic hospital in the county of York; that the hall and grounds had been given free to the nation by the owner to be used for this purpose; that there were 120 patients there, and a large number of ex-Service men who had received considerable benefit from treatment at this establishment; and that there was no other way in which they could be treated so economically; and would he reconsider his decision so as to allow the good work to proceed uninterruptedly.—Major G. C. TRYON replied: In view of the continuous decline in the number of pensioners requiring the kind of treatment provided at Oulton Hall it has been decided, after a careful review of the position throughout the country, to close this hospital (where there are at present 84 patients, only 42 of whom are drawn from the county of York) at or about the end of this month. In arriving at this decision, the points mentioned by the hon. Member have not been overlooked, but I have had to keep in view the general requirements and the necessity for making the most efficient and advantageous use of the facilities for neurological treatment at my disposal, having regard to the reduced number of cases to be dealt with and their distribution over the country as a whole.

Night-work in Bakeries.

Mr. TREVELYAN asked the Home Secretary what the figures were of the final vote in favour of the ratification of the convention for the abolition of night baking at the International Labour Conference; how many of the votes adverse to ratification represented governments and which governments; how many represented the employers; and how many the workers.—Sir W. JOYNSON-HICKS replied: The figures at the final vote showed 81 in favour of the draft convention and 26 against. Of the adverse votes, three were given by delegates representing the British and Indian Governments, and the remainder by employers' delegates. There were a considerable number of abstentions.

Medical Inspection of School-children.

Mr. BRIANT asked the President of the Board of Education whether the Board had taken any steps to enforce the provision of medical inspection for the detection and correction of visual defects in those schools under the 14 local education authorities which the chief medical officer of health, in his report of 1923, stated make no such provision.—Lord E. PERCY replied: I am glad to say that of the 14 local authorities in question six have, since the report was issued, provided for visual treatment, and seven others have submitted proposals for such provision. In the remaining case I am advised that any treatment which may be required can be obtained without special provision being made by the authority.

Compensation for Mr. W. S. Harnett.

Lord HENRY CAVENDISH-BENTINCK asked the Minister of Health whether he would advise the Government to pay to Mr. William Smart Harnett an adequate sum in compensation for his wrongful detention in various mental hospitals, having regard to the fact that Mr. Harnett had been found by a jury to have been sane when detained by Dr. Bond and for the rest of his detention, that this opinion had not been upset by either the Court of Appeal or the House of Lords, by which tribunals Mr. Harnett's case had been heard, and having regard to the fact that, although having thus been found to be sane, Mr. Harnett was to-day practically a ruined man on account of the legal expenses of the three actions in which he was concerned and the heavy expenses of his confinement, in all a sum of over £25,000.—Mr. NEVILLE CHAMBERLAIN replied: I do not think that any claim for compensation out of public funds can be substantiated in this case. In any event, no servant of the Crown was involved other than Dr. Bond, and, as my noble friend is no doubt aware, a new trial has been ordered against Dr. Bond, and the matter is therefore still sub judice. I must not, however, be taken as admitting that the question accurately states the facts, for I observe that the Lord Chancellor in his judgment dismissing Mr. Harnett's appeal expressly pointed out that it was not in fact proved at the trial, nor found by the jury, that the appellant was of sound mind between the date of his alleged detention by Dr. Bond and his subsequent escape from custody.

Ophthalmic Benefit.

Mr. BENNETT asked the Minister of Health whether he was aware that, as a result of the new model scheme for the provision of ophthalmic benefit by approved societies, which stipulated that an applicant for the benefit must, at the cost of 1*s.*, have obtained and furnished his society with a written recommendation from a panel doctor, the charge for the necessary ophthalmic examination of the applicant had increased from 5*s.*, which was the fee paid to qualified opticians, to £1 1*s.*, which was the fee charged by ophthalmic surgeons; and whether, in view of the satisfactory nature of the service heretofore rendered by qualified opticians, he would suspend the order until the Royal Commission on the disposal of the surplus funds of the various approved societies could investigate and report on the matter.—Mr. NEVILLE CHAMBERLAIN replied: I am aware that the cost of ophthalmic benefit under the new scheme may, in certain cases, show an increase as stated by the hon. Member over the cost of optical benefit under the existing schemes, but there will be no charge for the insurance doctor's recommendation, and the new arrangements have been generally accepted by approved societies. It is impracticable to adopt the suggestion in the latter part of the question, inasmuch as the new schemes for societies and branches, valued as at Dec. 31st, 1922, are due to commence on Monday next.

High Infant Mortality at Market Drayton.

Mr. GRIFFITH asked the Minister of Health whether he had seen a report of a recent meeting of the Market Drayton Nursing and the Maternity and Infant Welfare Associations, where Dr. Wheatley, the medical officer for Shropshire, alluded to the high infant mortality of Market Drayton, and said that the principal causes of the high rate of infant mortality were bad housing and ignorance, and that the remedies were education and better housing; and whether he would at once publish the report of his own medical woman inspector on Market Drayton, to show what was her view of the causes of, and remedies for, the high infant mortality.—Mr. NEVILLE CHAMBERLAIN replied: The answer to the first part of the question is in the affirmative. As regards the second part, I would refer the hon. Member to the answer which I gave on this subject on May 11th.

Sewage Pollution of the River Lee.

Captain GARRO-JONES asked the Minister of Health whether he was aware that the River Lee, which passed through thickly populated London districts, was at present badly polluted with crude sewage; that the pollution was now worse than it had ever been; that the state of the river was not only offensive to the many rowing clubs which used it but was detrimental to the health of the dense riparian population; that the powers under the Rivers Pollution Prevention Acts were, as respects this river, divided between the Middlesex County Council and the Lee Conservancy Board; and that most of the pollution originated from tributaries within the control of the Middlesex County Council; and whether he would consider the desirability of promoting a short Bill to make the Lee Conservancy Board the rivers pollution prevention authority for the whole length of the river and its tributaries, and immediately urging the urban districts in Middlesex and the Middlesex County Council, in the interests of public health, to cease discharging sewage into the River Lee and its tributaries.—Mr. NEVILLE CHAMBERLAIN replied: I am aware of the unsatisfactory condition of this river. I am not satisfied that it would be desirable to promote a Bill as suggested. The right remedy is to obtain treatment and disposal of the sewage, and my

efforts have been directed to that end. Two of the large local authorities are now spending large sums in improving their disposal works, and a Bill is now before Parliament for taking the sewage of two others into the London main drainage system. When these improvements have been effected, conditions should be very much better.

Birmingham Hospital Bill.

St. Mary's Church, Birmingham, and General Hospital Bill was read a third time.

FRIDAY, JULY 3RD.

Infant Death-rate in Bombay.

Colonel DAY asked the Under Secretary of State for India whether he was aware of the increasing practice in Bombay of women employed in cotton factories administering opium to their babies before proceeding to their work and that, as a result, the infant death-rate in Bombay was approximately two in three; and would he make representations to those concerned suggesting that opium be made less accessible.—Earl WINTERTON replied: I am aware of the practice, but not that it is increasing. The average annual figures of infant mortality from all causes for the three years from 1922 to 1924 was 411 per 1000, as compared with 624 in the previous three years. As regards the last part of the question, the Government of India have addressed inquiries to all local governments as to the extent of the practice referred to and the question of taking measures specially designed to check it; my noble friend proposes to await the results of these inquiries.

MONDAY, JULY 6TH.

Indian Medical Service.

Sir RICHARD LUCE asked the Under Secretary of State for India if the Government had yet arrived at conclusions as to the future of the Indian Medical Service; and whether it was their intention to carry out the proposals of the Lee Commission in this respect, especially in the matter of establishing provincial medical services the members of which would not be under the control of the Secretary of State.—Earl WINTERTON replied: The Government of India's proposals are now under the consideration of my noble friend the Secretary of State, who hopes to arrive at early decisions. Meanwhile I regret that I am unable to make any further statement.

Medical Services in Tanganyika.

Mr. BARCLAY-HARVEY asked the Secretary of State for the Colonies the amount spent on medical and sanitary services and research work by the Germans in Tanganyika in the year 1913; and what were the corresponding figures for the year 1923–24.—Mr. AMERY replied: Owing to the difference in the system on which the British and German estimates are presented, the comparison is by no means easy. The amount provided for the services referred to in the German estimates for 1913 is approximately £99,000, converting the mark at 20 to the £. But this does not include expenditure by certain local bodies to which grants were made for a variety of purposes, including expenses connected with hospitals and sanitation, which are not shown separately in the estimates. The amount provided for similar services in the estimates for 1923–24 was approximately £116,700, which included all expenditure on buildings.

Lieut.-Colonel JAMES asked if the right hon. gentleman was satisfied that the amount spent was sufficient to fight epidemic disease in Tanganyika.

Mr. AMERY: No, Sir; I should like to spend a great deal more.

New Tuberculosis Order.

Mr. ALBERT ALEXANDER asked the Minister of Agriculture whether he would have the draft of the Order he was proposing to make, directing the slaughter of cattle affected with tuberculosis on the lines of the Tuberculosis Order of 1914, placed in the Library of the House before the discussion takes place on the Diseases of Animals Financial Resolution.—Mr. WOOD replied: Yes, Sir; I hope to place a copy of the draft Order in the Library towards the end of the present week.

Food Preservative Regulations.

Sir ROBERT GOWER asked the Minister of Health whether he had received a communication from the Bakery Allied Traders' Association representing that the result of the proposed Public Health (Preservatives, &c., in Food) Regulations, 1925, would mean dearer food and an acute shortage of supplies, with actual starvation in sight should a national emergency arise; and whether he had any statement to make upon the matter.—Sir KINGSLEY WOOD replied: Yes, Sir, my right hon. friend has received the communication referred to, which has had very careful consideration. He cannot, however, admit that there is any substantial ground for the apprehension expressed in the latter part of my hon. friend's question.

Dirty Fruit from Turkey.

Dr. HADEN GUEST asked the Parliamentary Secretary to the Overseas Trade Department whether his attention had been called to the existence of dirty and insanitary conditions prevailing in the transport, handling, and packing of dried fruit at Smyrna, Anatolia, and to the rates of wages and conditions of labour of the workpeople employed; and whether he would make inquiry to determine what action, through the consular service or otherwise, was required to protect the consumer against dirt contamination and the Dominions fruit-grower against unfair competition.—Mr. A. M. SAMUEL replied: This matter has engaged the attention of the Ministry of Health and my department very fully for some considerable time, and I have been in frequent communication on the subject with both the Ministry of Health and H.M.'s Consul General at Smyrna. I will consider in conjunction with my right hon. friend what action it is possible to take after further reports, which I have called for, have been received from Smyrna.

Prohibition of Night Baking in Foreign Countries.

Mr. TREVELYAN asked the Minister of Labour how many European countries had already abolished night baking; and in how many of those countries there had been any resultant rise in the price of bread.—Mr. BETTERTON (Parliamentary Secretary to the Ministry of Labour) replied: The information available shows that legislation prohibiting night work in bakeries is in force in the following European countries: Austria, Belgium, Czecho-Slovakia, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Netherlands, Norway, Poland, Soviet Russia, Spain, Sweden, Switzerland (two cantons). This legislation does not necessarily follow the lines of the convention recently adopted by the International Labour Conference. I am unable to state from the official records of retail prices which are available how far any rise which may have taken place in the price of bread in the respective countries is attributable to the operation of such legislation.

TUESDAY, JULY 7TH.

Miners' Phthisis.

Mr. DAVID GRENFELL asked the Secretary for Mines whether he was in a position to report upon the inquiries of his department into the incidence of miners' phthisis among men engaged in rock-drilling by the use of compressed air machines.—Colonel LANE-FOX replied: I am not in a position to give any general conclusions, for the inquiry in question was confined to three mines. But its result was to support the apprehension that, in those mines, rock-drilling may be dangerous to health. I have arranged for a more extensive inquiry to be put in hand at once. Meantime the inspectors are taking up the question of precautionary measures at the three mines.

State Contributions to National Insurance.

Mr. RHYS DAVIES asked the Minister of Health if he would give the ratio of State contributions towards the national health and widows', orphans', and old age pensions insurance schemes, respectively, based on each £1 benefit payable or on any other unit of calculation.—Sir KINGSLEY WOOD replied: As the hon. Member is aware the State contribution towards the National Health Insurance system is two-ninths of the expenditure on benefits, exclusive of the cost of central administration; including this item the State contribution is just over one-quarter. It is estimated that the State contribution to the new pensions system will be equal, on the average, to one-quarter of the expenditure on benefits in the first ten years of the scheme and that after this period it will be approximately two-fifths of the expenditure.

Food Preservatives Regulations.

Mr. ALEXANDER asked the Minister of Health when the Public Health (Preservatives, &c., in Food) Regulations were to be laid before Parliament; whether any alterations in the published draft were proposed; and, if so, whether information as to the nature of these alterations could be supplied to Members before the regulations were finally made and laid before Parliament.—Sir KINGSLEY WOOD replied: My right hon. friend hopes that the regulations will be laid before Parliament adjourns. Considerable modifications have been made in the original draft as a result of full discussion between my right hon. friend's officers and the interests involved. The actual coming into force of the regulations will be postponed to enable necessary adjustments to be made by the trades concerned, and during that period my right hon. friend would hope that a discussion might be arranged in this House if there is a general desire for it.

THE TUBERCULOSIS CONFERENCE.

THE eleventh annual conference of the National Association for the Prevention of Tuberculosis, under the chairmanship of Sir Arthur Stanley and Sir Robert Philip, was held this week at the Robert Barnes Hall of the Royal Society of Medicine, when upward of 500 delegates attended. The international character of the gathering was indicated by papers written by scientists from Austria and Denmark. Dr. V. Vorobieff, professor of tuberculosis at Moscow University, brought the good wishes of his Russian colleagues.

The subjects under discussion were Tuberculosis in Childhood and the Treatment of Tuberculosis by Sanocrysin. The conference was opened by Sir Kingsley Wood. It had been intended that Prof. Pirquet should have delivered the introductory address, but being prevented Dr. Richard Wagner, his first assistant at the Vienna Children's Clinic, read his paper. Prof. Pirquet analysed with remarkable clarity the statistics of tuberculosis given in the Registrar-General's annual report for 1922. In his turn Dr. Wagner gave an illuminating account of the mode of treatment employed at the Vienna Clinic, the chief features of which were the complete disregard of tuberculin therapy and the attention paid to the feeding of the tuberculous child. Food-scales had been worked out in relation to the sitting height of the children who were given larger quantities of food than healthy children of the same age. Stress was laid on the desirability of dealing with tuberculous children in their own homes; hospital accommodation could not possibly be provided for all the cases existing. A slide illustrating a practical wooden balcony for open-air therapy, attached to the window of an ordinary house, was shown.

Dr. A. Stanley Griffith, of the Field Laboratories, Cambridge University, emphasised the importance of dealing with the menace of tuberculous cows' milk; he thought that the general public was not sufficiently informed of the fact that bovine tuberculosis was an important source of human tuberculosis. Sir Henry Gauvain stigmatised the argument that drinking slightly infected tuberculous milk would enable children to acquire immunity to infection as a dangerous and unnecessary doctrine; even if it was proved to be correct there would be more scientific methods of imparting such immunity. Medical men would hesitate to eat infected oysters knowingly to immunise themselves against typhoid fever. Prof. J. Fraser, of Edinburgh, pointed out the large proportion of cases of surgical tuberculosis coming from country districts to the Edinburgh Children's Hospital; this he attributed to the ignorance of the cow-keeper of the harm done by tuberculous milk. Sir Percival Hartley expressed his entire agreement with all that had been said on the dangers of tuberculous milk and finally, at the instance of the (medical) chairman of the St. Helens Public Health Committee, a resolution was sent by the conference to the Ministry of Health urging the Government to render effective the provisions of the Milk and Dairies Act dealing with tuberculous milk.

Instructive accounts of the treatment of surgical tuberculosis at Alton and Carshalton were given by Sir Henry Gauvain and Dr. W. T. Gordon Pugh. Slides were shown illustrating the successful treatment of marked kyphosis at Alton by hyperextension. Dr. Pugh showed carriages on which a child could be satisfactorily immobilised during attention to its natural functions and the toilet of the hair. Pushed on these carriages the children were able to go out and see the shops and pay a visit to the cinema. He emphasised the importance of parents allowing their children to be sent to hospital in an early stage of the disease. Prof. Louise McIlroy pointed out the lack of coördination existing at present between the obstetrician and the tuberculosis physician; she wanted a sanatorium equipped with an obstetrical staff instituted near the borders of London for pregnant tuberculous women.

The last session was devoted to papers by Profs. Mollgaard and Knud Faber, of Copenhagen, and Prof. S. Lyle Cummins on the sanocrysin treatment. Sir Robert Philip expressed a guarded opinion that the ultimate outlook of this method of treatment is encouraging, and praised the scientific attitude taken up by Prof. Mollgaard, who had placed his knowledge at the disposal of the Medical Research Council. Emphatic opinions were expressed by hospital workers and tuberculosis officers on the folly of allowing advanced cases to take their discharge from institutions and so return home to infect the young children of the family.

Medical News.

UNIVERSITY OF LONDON, KING'S COLLEGE FOR WOMEN.—At the third B.Sc. examination in Household and Social Science held recently the following candidates were successful:—

Edna G. Allen, Margaret F. Brownlee, Zélie G. Bull, Bertha M. Grainger, Grace J. Helps, Hyacinth E. Kirwan, Nancy H. Knowles, Elspeth M. Marshall, Helen E. Ross, Dorothea V. C. Story, Enid C. Strange, Annie Sutcliffe, and Mary M. G. Wright.

UNIVERSITY OF OXFORD.—The following candidates passed in the recent Final Examination for the degrees of B.M. and B.Ch.:—

Materia Medica and Pharmacology.—Howard W. Allen, Merton; Ormond A. Beadle and Denis H. Brinton, New; Conal Charleson, Queen's; Henry E. Cuthbert, St. John's; Johannes G. A. Davel, Trinity; Walter N. Dickenson, Pembroke; Hugh R. J. Donald and Cecil W. Flemming, Trinity; Kenneth A. Hamilton, Christ Church; Reginald A. Haythornthwaite, Keble; Otto Hooper, University; Charles W. Hope-Gill, Queen's; Stanford Howard, Christ Church; George L. M. Inkster, Balliol; Arthur J. Leslie-Spinks, Oriel; George E. Macdonald, New; Robert G. MacGregor, Worcester; Patrick C. Mallam, Queen's; Ripley Oddie, Oriel; Robert Okell, Christ Church; Malcolm G. Pearson, Keble; Jack W. Pugh, University; Hill G. Wells, Magdalen; and Edward M. B. West, New.

Pathology.—Ormond A. Beadle, New; Louis W. H. Bertie, St. John's; Denis H. Brinton, New; Wilbert H. Brown, Queen's; Noel Chilton, Brasenose; John H. Chitty, New; Alan W. Cubitt, Wadham; Eric L. Fothergill, Keble; Alan C. Gairdner, University; Arthur H. Gale, Trinity; Thomas B. Hodgson and Charles W. Hope-Gill, Queen's; Alfred Kendrew, Christ Church; James H. Kennedy, Magdalen; David Lurie, Lincoln; Clifford E. Roberts, Jesus; Richard W. A. Simmons, Oriel; Edward M. B. West, New; Arthur G. Wilson, Brasenose; Rosalind V. Carruthers and Margaret A. L. Herbertson, Society of Oxford Home Students; Margaret N. Jackson, Somerville; Kathleen G. Norton, St. Hugh's; and Irene M. Titcomb, Society of Oxford Home Students.

Forensic Medicine and Public Health.—Douglas A. Abernethy and Eric N. Allott, Balliol; Frank J. Bach, New; Robert B. Bourdillon, University; Hugh N. Bradbrooke and Clarence S. Broadbent, Queen's; Albert V. Clemmey, Christ Church; Charles R. Croft, Trinity; John N. C. Ford, Hertford; Samuel Harris, Jesus; Thomas B. Hodgson, Queen's; Alfred Kendrew, Christ Church; Raymond Lewthwaite, Magdalen; Thomas M. Ling, New; Gerald L. M. McElligott, Hertford; William D. B. Read, Magdalen; Clifford E. Roberts, Jesus; Richard W. A. Simmons, Oriel; John W. de W. G. Thornton, Magdalen; George P. Thorold, Trinity; Oliver R. Tisdall, Hertford; Arthur L. Wilkinson, Trinity; William R. Wood, Pembroke; Hon. Olive B. Buckley, Somerville; Kathleen G. Norton, St. Hugh's; Janet M. Vaughan, Somerville; and Rosa S. Wordsworth, Lady Margaret Hall.

Medicine, Surgery, and Midwifery.—Douglas A. Abernethy and Eric N. Allott, Balliol; Robert B. Bourdillon, University; Hugh N. Bradbrooke, Queen's; John S. Jerome and Alfred Kendrew, Christ Church; Eric L. Newell and Clifford E. Roberts, Jesus; Victor P. Robinson, St. John's; John G. S. Thomas, Hertford; Robert A. Walsh, Magdalen; Evelyn C. Whitehall-Cooke, Queen's; Hon. Olive B. Buckley, Somerville; Ella J. Cockram, Society of Oxford Home Students; and Janet M. Vaughan, Somerville.

The following Theodore Williams Scholarships have been awarded: In Physiology, F. Hawking (University Coll.); in Human Anatomy, J. M. Gibson (University Coll.); in Pathology, O. A. Beadle (New Coll.). The Welsh Memorial Prize for Anatomical Drawing was awarded to J. H. B. Beal (scholar of University Coll.). The Radcliffe Scholarship in Pharmacology was awarded to K. A. Hamilton (Christ Church). Recent elections by external bodies:—To a Commonwealth Fund Fellowship: B. G. Scholefield (Christ Church and Guy's Hospital); to Rockefeller Medical Fellowships: W. S. Dawson (Trinity Coll.), H. W. Florey (Magdalen Coll.), and G. P. Wright (Exeter Coll.).

ROYAL COLLEGE OF SURGEONS OF ENGLAND: ELECTION OF COUNCIL.—The annual meeting of Fellows of the Royal College of Surgeons to elect three members of the Council was held on July 2nd, the President, Sir John Bland-Sutton, Bart., in the chair. There were seven candidates for three vacancies. The President declared the following three Fellows to be elected :—

	Votes.	Plumpers.
Arthur Henry Burgess	462	48
James Sherren	441	14
Sir John Lynn-Thomas	406	7

The other candidates were :—

Victor Bonney	361	19
Vincent Warren Low	332	12
John Percy Lockhart-Mummery ..	243	11
Herbert John Paterson	232	18

The President further declared that 964 Fellows had voted, 961 sending ballot-papers through the post, and 3 voted in person. Three invalid ballot-papers were received. Mr. H. J. Price (of Maldon) and Mr. Wilmott Evans (of Harley-street) were the scrutineers.

LIVERPOOL'S NEW HOSPITAL FOR WOMEN.—At a well-attended meeting held at Liverpool on June 29th approval was given to the scheme for the amalgamation of the Hospital for Women (Shaw-street) and the Samaritan Hospital, and authority was given for the issue of a public appeal for £80,000, which, with the £40,000 already in hand, will make up the £120,000 estimated for the new building and its equipment. Both of these hospitals have a large record of usefulness, but the present buildings—with 85 beds—are out of date. The new scheme will provide 120 beds. At the meeting promises of subscriptions to the amount of £10,000 were announced, including £5000 from the sons of the late Alderman Cohen, £1000 each from Sir Charles Nall-Cain and Lieut.-Colonel Campbell N. Watson, D.S.O., £600 from Mrs. J. R. Hughes, and £500 each from Sir William Forwood and Sir Richard Caton, £250 each from Messrs. Balfour, Williamson and Co. and Mr. Frank Minoprio, and £200 each from Dr. Gemmell, Mr. Archibald Crawford, and Messrs. Wm. Crawford and Sons, Ltd.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION.—A late afternoon course in the Diagnosis and Treatment of Common Diseases of the Nervous System has been arranged by the West End Hospital from July 27th to August 14th. The lectures and clinical demonstrations will be given in the out-patient department at 73, Welbeck-street.—A vacation course will be held at the Prince of Wales's General Hospital (North-East London Post-Graduate College, Tottenham) from August 4th to 15th. The daily sessions from 10.30 A.M. to 5.30 P.M. will include lectures and demonstrations in all branches of Medicine and Surgery and in the Special Subjects, including Mental Diseases and Fevers, the first of which will be by Mr. Lockhart-Mummery. The formal lecture, at 4.30 P.M., will be free to members of the Fellowship of Medicine.—From August 24th to Sept. 5th the Queen Mary's Hospital, Stratford, will give an intensive course, when lectures, demonstrations, ward rounds, operations, &c., will be demonstrated in the various departments of medicine, surgery, and the specialties.—The following special courses will take place in September: Diseases of the Chest, Infants, Dermatology, Electrotherapy, Ophthalmology, and an intensive course at the Westminster Hospital.—Copies of the syllabus of each of the above-mentioned special courses and the programme of the Fellowship of Medicine will be sent on application to the Secretary at 1, Wimpole-street, London, W. 1.

IRISH MEDICAL ASSOCIATION: ANNUAL MEETING.—The annual meeting of this Association was held on June 25th at the Royal College of Surgeons in Ireland, Senator W. O'Sullivan, M.D., President, in the chair. There was only a fair attendance of the 456 members on the books of the Association on Dec. 31st, 1924. Prof. F. C. Purser, of Dublin, and Dr. H. T. Warnock, of Donegal, were unanimously elected President and Vice-President. Prof. Purser, in his presidential address, pointed out that an overwhelming body of medical opinion in Ireland was in favour of the continuance of the present system of medical registration. It was not inconsistent with their national aspirations, because no pressure was put on them to continue as they were, and they could end their coöperation with the General Medical Council at the termination of any agreement come to between the Irish and English Governments. Economically, it was true, they were training many able men and women who could not hope to earn a living in Ireland, but the solution of this did not lie in setting up an Irish Medical Council. These young men and women intended to join the profession anyhow, and if they could not get trained in Ireland they would get trained elsewhere, to the great loss of Dublin, Cork, and Galway.

ROYAL INSTITUTION.—A general meeting of the members of the Royal Institution was held on July 6th, Sir James Crichton-Browne, Treasurer and Vice-President, in the chair. The special thanks of the members were returned to the Delegacy of the City and Guilds (Engineering) College for their valuable gift of micro-photographic apparatus. Mrs. Romanes and Dr. R. A. Young were elected members.

NURSING AND PUBLIC HEALTH.—At the annual meeting of the Manchester and Salford District Nursing Institution held on June 30th Dr. R. Veitch Clark, medical officer of health for Manchester, spoke of the way in which the associations and the public health authorities might be most usefully developed. It was in dealing with diseases of young children—measles, whooping-cough, bronchitis, and bronchial pneumonia—that the practice of curative and that of preventive medicine were closely interlinked. Nursing associations were primarily established for the care of those who could not themselves afford to pay for nursing, and indeed a large part of the work of their association was confined to such cases. Between the very poor and the rich there were two classes, represented by the wage-earners under the National Health Insurance Act and by the group immediately above this class who were not wealthy, but reasonably comfortable. Dr. Clark outlined a scheme whereby the families of the "reasonably comfortable" group could obtain cheap nursing benefits. Employees at private firms would contribute 1*d.*, 2*d.*, or 3*d* a week to the Nursing Institution and receive in return any nursing that from time to time they might require. The contributions could be paid weekly or monthly, according to the amount of nursing desired, or a definite charge could be paid for the daily visits of the nurse as required. The scheme, he said, was a practical one; before he came to Manchester he had established one elsewhere on similar lines and it was running successfully.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, July 13th, to SATURDAY, July 18th.—QUEEN'S HOSPITAL FOR CHILDREN, Hackney-road, E. Special Course in Diseases of Children daily from 10 A.M., morning and afternoon sessions covering demonstrations, ward round, out-patient departments, and operations (second week).—ST. PETER'S HOSPITAL, Henrietta-street, W.C. Special Course in Urology. Clinical work every afternoon throughout the week. Lectures: Monday, Mr. J. Swift Joly: Tumours of the Urinary Tract; Tuesday, Mr. Swift Joly: Urinary Calculi; Wednesday, Mr. Clifford Morson: The Relationship of Urology to Group Medicine; Thursday, Mr. F. J. F. Barrington: Non-tuberculous Infections of the Urinary Tract; Friday, Sir John Thomson-Walker: Urinary Obstruction.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.

MONDAY, July 13th.—11 A.M., Surgical Registrar: Surgical Wards. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Donald Armour: Operations.

TUESDAY.—11 A.M., Dr. McDougal: Electrical Dept. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept. 3 P.M., Dr. Pritchard: Medical Wards.

WEDNESDAY.—11 A.M., Medical Registrar: Medical Wards. 2 P.M., Dr. Burnford: Medical Wards. 2 P.M., Dr. Dowling: Skin Dept.

THURSDAY.—11 A.M., Sir Henry Simson: Gynæcological Wards. 12 noon, Dr. Pritchard: Modern Methods of Medicine. 2 P.M., Mr. MacDonald: Genito-Urinary Dept.

FRIDAY.—10 A.M., Sir Henry Simson: Gynæcological Operations. 12 noon, Surgical Registrar: Surgical Pathology. 2 P.M., Mr. Viasto: Throat, Nose, and Ear Dept.

SATURDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.

Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.

TUESDAY, July 14th.—4.30 P.M., Mr. N. B. Fleming: Fundus Changes as an Index of General Diseases.

FRIDAY.—4.30 P.M., Mr. W. E. Tanner: Surgical Aspects of Tuberculous Mesenteric Glands.

Daily: In- and Out-patient Cliniques, Operations, Cliniques in Special Departments, &c.

QUEEN CHARLOTTE'S MATERNITY HOSPITAL, Marylebone-road, N.W.

THURSDAY, July 16th.—5 P.M., Mr. Leslie Williams: Toxæmia of Pregnancy.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.

THURSDAY, July 16th.—4 P.M., Dr. Thursfield: The Treatment of the Asthmatic Child.

Appointments.

FAULKNER, H. A., M.R.C.S., L.R.C.P. Lond., B.V.Sc., has been appointed a Member of the Honorary Medical Staff of the Willesden General Hospital.

GILMOUR, J., M.S. Durh., F.R.C.S. Eng., Hon. Assistant Surgeon, Royal Victoria Infirmary, Newcastle-on-Tyne.

Royal Northern Hospital, Holloway: CALVERT, I. E. G. B., M.D., M.R.C.P., Physician with charge of Out-patients; LANE-ROBERTS, I. C. S., F.R.C.S., Obstetric Surgeon with charge of Out-patients.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen County.—Asst. M.O.H. £600.
Bath, Royal Mineral Water Hospital.—Res. M.O. £130.
Birkenhead Union Infirmary.—Res. Asst. M.O. £300.
Birmingham University.—Lecturer in Physiological Dept. £300. Also Demonstrator of Anatomy. £300.
Bournemouth, Royal Victoria and West Hants Hospital.—Res. H.S. £150.
Cairo, School of Dental Surgery.—Supt. and Lecturer in Metallurgy, &c. £E.900. Lecturer in Surg. £E.480. Asst. Lecturer in Surgery. £E.360. Lecturer in Mechanics. £E.480.
Cardiff City Mental Hospital, Whitchurch.—Res. Clin. Asst. 50 guineas.
Colombia, South America.—Hosp. Asst. M.O. £600–£650.
Eastbourne, Royal Eye Hospital.—Hon. Ophth. S.
Edinburgh University.—Chair of Public Health. £1000.
Evelina Hospital for Children, Southwark, S.E.—H.S. £120.
Exeter, Royal Devon and Exeter Hospital.—Reg. and Clin. Asst.
Hampstead General and N.W. London Hospital, Haverstock-hill, N.W.—Radiologist. £100.
Hertford County Hospital.—H.S. £150.
Hong Kong University.—Reader in Biology. £600.
Lanark County.—Bacteriologist and Pathologist. £750.
Liverpool Royal Infirmary.—Hon. Asst. Surg.
Liverpool, Royal Southern Hospital.—Hon. P.
Manchester, Ancoats Hospital.—Hon. Radiologist. H.S. at rate of £100. Also Anæsth. 10*s.* 6*d.* per attendance.
Margate, Royal Sea Bathing Hospital.—H.S. £200.
Metropolitan Ear, Nose, and Throat Hospital, Fitzroy-square, W.—H.S. £150.
New Zealand Government, Mental Hospitals Dept.—Two Asst. M.O.'s. £615.
Northampton General Hospital.—Hon. Asst. S.
Norwich, Norfolk and Norwich Hospital.—Res. Anæsth. £150.
Oldham County Borough.—Asst. School M.O. £600.
Royal Northern Hospital, Holloway, N.—M.O. in charge of Electro-Therapeutic and Massage Dept. 100 guineas. Also S.
St. Mark's Hospital for Cancer, &c., City-road, E.C.—Hon. S. Also Hon. Asst. S.
St. Paul's Hospital for Skin, &c., Diseases.—Hon. Anæsth.
Salisbury General Hospital.—Hon. S. £150.
Samaritan Free Hospital for Women.—H.S. £100.
Southampton, Royal South Hants Hospital.—Jun. H.S. £150.
Staffordshire Education Committee.—Asst. Sch. Med. Inspect. £600.
Staffordshire General Infirmary.—H.S. £200.
Sudan Govt., Wellcome Tropical Research Laboratories.—Asst. Bacteriologist. £E.720.
West Derby, Liverpool, Alder Hey Children's Hospital.—Male and Female Res. Asst. M.O. Each £200.
Whittingham, Preston, County Mental Hospital.—Temp. M.O. £7 per week.

The Chief Inspector of Factories, Home Office, London, S.W., announces a vacancy for a Certifying Factory Surgeon at Torpoint, Cornwall.

Births, Marriages, and Deaths.

BIRTHS.

BROWN.—On June 29th, at "Kingslea," Sutton, Surrey, the wife of Dr. C. Carron Brown, of a son.

LODGE.—On July 2nd, at Heath Hall, Halifax, Yorkshire, the wife of W. O. Lodge, M.D., F.R.C.S. Edin., of a daughter.

MARRIAGES.

NICHOLLS—SCHUSTER.—On July 2nd, Marriott Fawckner Nicholls, B.A., M.R.C.S., L.R.C.P., son of the late Marriott Nicholls, Esq., to Norah Henriette Schuster, M.B., Ch.B., daughter of Sir Arthur Schuster, Kt., F.R.S.

THOMAS—RICKS.—On July 1st, at the Parish Church, Cockington, Torquay, by the Rev. H. Studdy, M.A., Clement Price Thomas, F.R.C.S., to Ethel Doris, daughter of Mr. and Mrs. Mortimer Ricks, Paignton, S. Devon.

DEATHS.

FRASER.—On June 30th, Evan J. H. Fraser, M.D., F.R.C.S. Edin., of Hull.

HARFORD.—On July 4th, suddenly, at Shirley, Harpenden, Charles Forbes Harford, M.D., First Principal of Livingstone College, aged 60.

HOVELL.—On June 30th, Thomas Mark Hovell, F.R.C.S., of Harley-street and Hatfield, Herts, aged 72.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

THE ARTIFICIAL SUNLIGHT CLINIC AT KINGSTON-UPON-HULL.

THE first municipal clinic to be established in this country for the treatment of rachitic children by artificial sunshine was opened last year at 69, Coltman-street, Hull. A few months later the city of Liverpool, after sending a deputation to Denmark, set up at their Fazakerley Sanatorium an installation for the treatment of tuberculosis of the bones and joints. The first municipal clinic in London for the provision of treatment by artificial sunlight was opened in St. Pancras during March, and several other clinics are now running in the metropolis.

Procedure at the Hull Clinic.

A report of the Hull clinic has just been published by Dr. W. Allen Daley, medical officer of health, and Dr. Kathleen Gamgee, assistant medical officer for maternity and child welfare. The infants are weighed and measured, their history taken, and their blood tested for hæmoglobin content in rooms on the ground floor. The sunlight treatment is given in a small room (15 feet by 12 feet) on the first floor. Two or three mothers can wait in a small dressing room adjoining the treatment room. The period of exposure of each patient to the ultra-violet rays varies from 3 to 15 minutes. One child only is treated at a time, and is held, without clothing, in front of the arc lamp by a nurse. Another nurse controls the arc lamp, and a third nurse is engaged downstairs. Dr. Gamgee is responsible for the ordering of the time of exposure required for each child, and attends the clinic whenever it is open. The lamp, had it not been presented to the corporation, would have cost about £35; renewal of electrodes has cost £9 16*s.* 10*d.*, and electricity 18*s.* 9*d.*

During the year 110 patients have been treated at the clinic. The children for treatment were selected by the health visitors who, in the course of their home visits, discovered rickety children who had not in most cases attended a maternity and child welfare centre. These children were examined by the assistant medical officer, and if she considered them suitable for treatment they were put upon the waiting list for the artificial sunlight clinic. In the meantime they were given advice with regard to diet and general hygienic treatment, the routine being to prescribe pure cod-liver oil and one pint of milk per day for each child, and, in severe cases, daily tepid sponging and gentle massage by the mothers until the child can be transferred from the waiting list to the artificial sunlight clinic. This treatment has improved the health of the child in cases where the mother is persevering and intelligent, *but improvement effected in this way is far more gradual and altogether a slower process than the dramatic changes seen at the artificial sunlight clinic.*

Each child is subjected on its first attendance to a careful and prolonged physical examination. It is weighed and measured and its blood tested. The dosage for each child is small at first and increased very gradually. It is remarkable how little skin reaction some of these babies give to doses that quickly cause the skin on an adult to peel. The browning produced by the tungsten arc is not great. Many of these babies become browner *after* the treatment. They lose their transparent anæmic look, become livelier, and at the same time more peaceful. The first improvement is usually registered by the mother who states, of her own accord, that her baby is more active, but at the same time sleeps more and is far less trouble at home. One of the cardinal symptoms of rickets is the nervousness and irritability of the small patient. It is one of the first symptoms to yield to the artificial sunlight cure properly administered. Another point to note is the rapidity with which the marked anæmia yields to the ultra-violet radiations. Out of 88 cases only 10 cases (four of them cases of grave organic disease) showed no increase in the percentage of the hæmoglobin (red colouring matter) of the blood. In one case, that of a delicate and very anæmic little girl of 4½, who had been under prolonged treatment by private doctors and had been under treatment for some time at the Owen Hall centre, the Hb percentage increased by 100 per cent. at the end of her six weeks' course.

The estimation of the hæmoglobin percentage is most conveniently done by Tallquist's method. Although not a scientifically reliable method, it is a good working scale if done by the same person each time, and it has the advantage of simplicity and quickness and of not alarming the baby more than is absolutely necessary.

Classification and Results.

Up to the time of reporting 110 patients have been treated at the clinic; 24 are still under treatment, and of the

remaining 86, 18 were discharged: because of irregular attendance, 7; development of infectious illness, measles, &c., 10; extreme fretfulness of child, 1.

The remaining 68 cases are divided into the following classes:—

(1) *Severe Rickets:* These cases include some with marked deformity, others with less marked although still obvious deformity, but with severe impairment of general health.

(2) *Slight Rickets:* Including cases of rickets with slight bony deformity.

(3) *Wasting Babies:* No definite rickets.

(4) *Other Conditions.*

(5) *Infantile Paralysis* (anterior poliomyelitis).

The following table sets out the results of treatment:—

—	Number treated.	Much improved.	Improved.	No. change.	Worse.
Severe rickets ..	31	19	10	2	0
Slight rickets ..	22	15	5	2	0
Wasting babies.	6	5	1	0	0
Other conditions	8	0	4	4	0
Old anterior poliomyelitis ..	1	0	0	1	0
—	68	—	—	—	—

Eight cases admitted as suffering from malnutrition or rickets and found to be suffering from grave organic disease (such as kidney disease, tuberculosis, heart disease) were transferred to the children's hospital or to their private doctor. There was a satisfactory attendance, even from those who had to come on two trams, and this indicates that the parents at all events are convinced that their children are improved by treatment at the clinic. The keenness and interest of the mothers is remarkable, and the percentage of cases that have had to be cancelled owing to irregular attendance is very small and is decreasing with each batch of cases treated.

Repeat Courses.

In every case where it is felt that the condition of the child demands it, a repeat course, or even two or three repeat courses (of six weeks' duration each) are given. Experience has taught that it is better to allow an interval of six weeks to elapse before the second repeat course is given. It is very noteworthy how much the child continues to improve in the weeks immediately following the first course of treatment. Re-examination of old cases showed that not only had the good condition of the child been maintained throughout several months, but that it had gone on improving, and the hæmoglobin percentage had not gone down, but had maintained the high level reached at the end of the course of treatment.

Requirements of a Sunlight Clinic.

The treatment is now well beyond the stage of trial; arrangements should be made for making it more readily available for all who require it, including not only rachitic and wasted infants, but also cases of tuberculosis of the bones and joints.

The accommodation which would be necessary in a fully equipped artificial sunlight treatment centre would be two rooms for carbon arc treatment—one for males and one for females—and either two large rooms or a number of smaller rooms in which treatment could be given by the tungsten arc and by mercury-vapour lamps. A waiting room would be necessary; also a recovery room, in which the patients could remain after treatment; a medical examination room; a record room; a nurses' room; and an X ray room with developing room and film room attached. Sanitary accommodation for patients and staff would also be required. The staff which would be necessary for a fully developed centre would be a whole-time medical officer, four or five nurses, a clerk, and a porter.

The cost of the electrical apparatus and wiring of the fully developed clinic would be approximately £1000 and an additional £1000 would be required for furnishing. Further cost, of course, would be entailed by the purchase or rent of the building and its adaptation. At first the medical staff need consist only of the services of a part-time medical officer who might train a junior member of the profession, who would eventually be able to take full charge. The other staff, which would be required at first, need not consist of more than two or three nurses, with the necessary clerical assistance.

THE ASFURIYEH MENTAL HOSPITAL.

BEFORE the opening of the Lebanon Mental Hospital at Asfuriyeh the treatment of mental disease in Syria was entirely in the hands of native priests and exorcists whose cruel and ignorant methods usually aggravated greatly the sufferings of their unfortunate victims. Theophilus Waldmeier, the founder and first superintendent of the above hospital, had a remarkable career. Born in Switzerland, he passed from Roman Catholicism, through ecclesiastical Protestantism to Quakerism. He was a missionary to Abyssinia in the days of King Theodore, whose friend he became. He suffered imprisonment at the hands of the king and for a time his life and that of other prisoners was in grave danger. From Abyssinia he passed to Syria, where, on Mount Lebanon, he eventually founded the Friends' Syrian Mission, turning from that, after some 25 years, to the founding of the mental hospital.

The twenty-sixth annual report of this institution records considerable financial difficulty in carrying on the work, many old supporters having been lost by death. During the year 141 patients were admitted, making a total of 228 under care, and there has been a gratifying freedom from accident and infection. Every effort is made to keep the patients occupied and an electro-therapeutic plant has been installed. The dementia præcox and manic-depressive groups of psychoses account for the vast majority of admissions, and in Syria, as in this country, the principal causes assigned for the mental breakdown are mental stress, syphilis, and heredity. The recovery-rate is 21 per cent., with a further 15 per cent. discharged relieved.

THE TRAINING OF HEALTH VISITORS: CENTRAL EXAMINING BODY.

ON April 1st last the administration of Exchequer grants for the training of health visitors was transferred from the Board of Education to the Ministry of Health. The conditions on which grants are now made by the Minister of Health were set out in THE LANCET of Feb. 21st (p. 420). Students will be required to enter for an examination to be conducted by a central examining body, and the Minister has now approved the Royal Sanitary Institute as this examining body. The Institute will conduct the examinations for health visitors in accordance with the conditions prescribed in Memo. M.C.W. 101, and will issue certificates to candidates who pass the examination and who satisfy the other conditions specified in the memorandum. The diploma issued to students who, before April 1st, 1925, began a course of training approved by the Board of Education, will be regarded as equivalent to the health visitor's certificate. Communications should be addressed to the Secretary, The Royal Sanitary Institute, 90, Buckingham Palace-road, London, S.W. 1.

THE MISSION TO LEPERS.

FOUNDED in 1874, the Mission to Lepers has now published its fiftieth annual report. Nearly 8000 lepers are being supported wholly or partly by the funds of this mission, and over 700 untainted children are being kept and educated in separate homes. The nature of the work has wholly changed since its inauguration owing to the curative treatment now possible. The new treatment is being given at an increasing number of the homes and many lepers have been discharged cured. Dr. R. M. Wilson reports from Korea that chaulmoogra oil and camphor have been found to give better results than the esters. The importance of treating predisposing causes such as hookworm, typhoid, syphilis, and kala-azar is being increasingly realised. The chief need is to find some way of attracting the early cases; a small patch of anæsthesia is liable to be concealed because of the ostracism that must follow its discovery. The Mission has appointed a special secretary for medical work, Dr. Robert G. Cochrane. During the last year Dr. Thomas Cochrane has conducted a world survey of leprosy, which has emphasised the urgent need for new work in Africa.

THE GROWTH OF A HOSPITAL.

IN support of the appeal for the extension of the nurses' home of the Manchester Royal Infirmary an interesting illustrated booklet has been issued setting forth the various stages in the growth of the infirmary. There is a picture of "The Publick Infirmary" in Manchester, opening on the 24th day of June, 1752, and this is followed by a view of the "Daub Hole Fields Infirmary" as it appeared in July, 1755. Then follow pictures of the "Old Infirmary" and its successor. A comparison between the staffs and patients in July, 1752, and in 1924 is shown in the following table:—

	1752.	*1924.*
Beds	12	750
Medical staff non-resident ..	—	23
Nurses	1	233
Porters	1	21
Domestic staff	1	141
In-patients	75	12,386
Out-patients	249	42,348

DONATIONS AND BEQUESTS.—Mr. Solomon Whitta, Bowes-park, N., who left estate valued at nearly £11,000, bequeathed the bulk of the estate for equal division between the London Hospital, St. George's Hospital, the Royal Northern Hospital, Holloway-road, N., and the Hospital for Women, Soho-square, W.C.